A CHILTON PUBLICATION

the Iron Age

THE NATIONAL METALWORKING WEEKLY

November 20, 1952

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National Bureau of Standards
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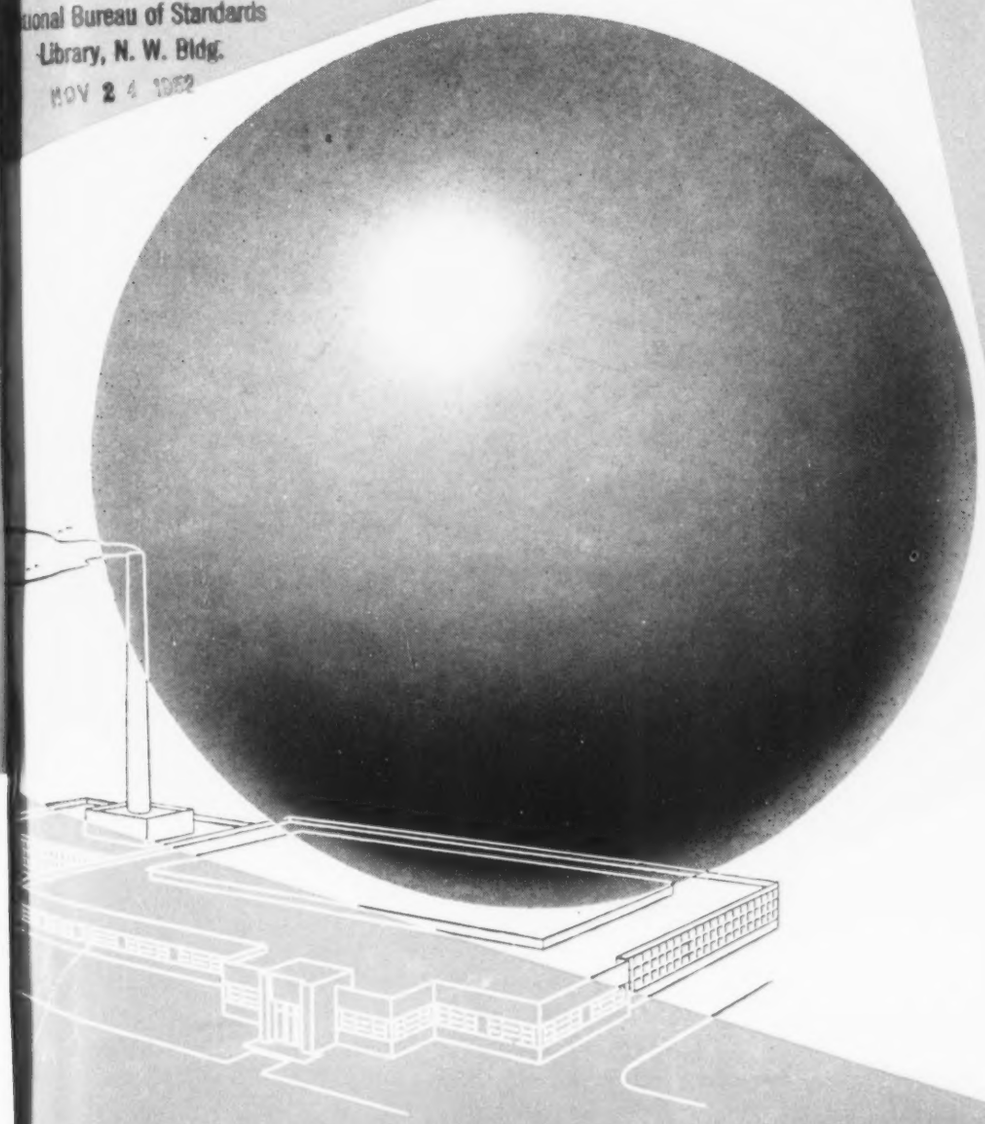

BIG ROLE in industry

In every phase of the American industrial scene, New Departure Ball Bearings play a leading role. They perform so efficiently, so effortlessly, that they are often taken for granted. But designers, engineers and manufacturers know how indispensable they are in thousands of applications.

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NEW DEPARTURE • DIVISION OF GENERAL MOTORS • BRISTOL, CONNECTICUT

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FO-1, "How To Make Your Cupola Operation More Efficient"
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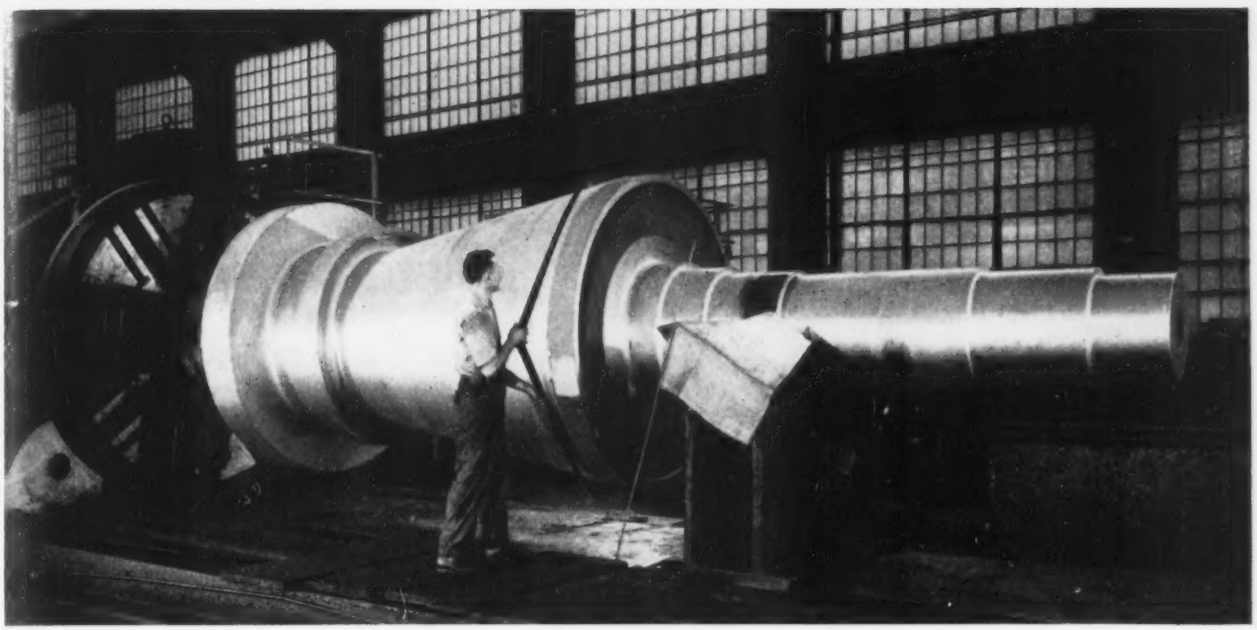
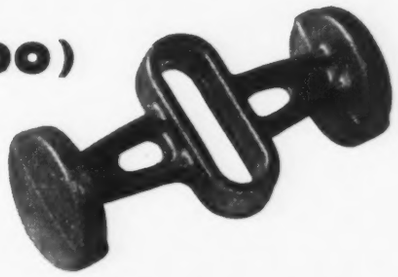
FO-3, "Hot-Blast"
FO-4, "Facts On Duplexing"
FO-5, "Here's How To Save Melting Fuel"



There are GIANTS in our family

(AND LITTLE FELLOWS, TOO)



Probably very few people have met the entire Bethlehem family of forgings. It's so big, and includes such a multitude of sizes and types, that the family tree is really something.

Bethlehem forges giants like the turbine rotor shown here. But big as it is, this is by no means the largest forging we ever made. The steel rolls are husky specimens too. On the other hand, that little drop forging is one of the kindergarten crop—size-wise, anyhow. In quality, it's on a par with its bigger Bethlehem brothers.

You can count on Bethlehem for almost everything in forgings—pieces ranging in weight from a few ounces to many tons. What's more, we can ship them in any condition you want—untreated or heat-treated, as-forged, rough-machined, or beautifully finish-machined.

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BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

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The Iron Age

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DIGEST of

NEWS DEVELOPMENTS

HOUSTON HUB OF PETRO-CHEMICAL GROWTH—P. 65
Burgeoning industry and commerce have transformed Houston from frontier village to fastest-growing metropolis. A muddy bayou has been transformed into 50-mile-long Houston Ship Channel, lifeline of the city. Texas' vast reserves of oil and gas assure continued growth of mushrooming chemical industry.

HARVESTER STRIKE PUNCTUATED BY VIOLENCE—P. 71
Chicago was shaken by bombings and violence that ran concurrently with a strike at International Harvester called by United Electrical Workers Union. Two non-striker homes were bombed. One non-striker was beaten. Another was murdered and police charge a union man with the crime.

HUGE MAGNESIUM SURPLUS BEING STOCKPILED—P. 76
Monthly production of over 9000 tons more than doubles combined civilian and military consumption. The national stockpile gets about 5000 tons a month. Fabricators ask shift from group II to group III to keep some facilities going. Magnesium Assn holds eighth annual meeting in New York.

STEEL OUTPUT UNDERMINES CMP EXTENSION—P. 77
Industry's quick rebound from the steel strike is worrying "professional controllers." Administration had believed metal shortages could be used as an effective argument for prolonging many control regulations. Pressure may be exerted on Gen. Eisenhower to maintain much of present control program.

CAR HORSEPOWER RACE HAS GOOD, BAD SIDES—P. 82
There are at least two sides to the current race for highest horse power by automakers. Some claim higher-powered cars are too dangerous, others point to higher efficiency, longer life. Still others claim the race is a sales and advertising gimmick, that there is no real hp race, but a performance contest.

CAN REPUBLICANS CUT THE FEDERAL BUDGET?—P. 87
Although some cuts will be made, Republicans will not be able to slice huge savings out of the new budget. It's reported the White House will offer a budget of $85 billion. Republicans are believed hopeful of holding outlays to $70 billion. Defense spending will brake any large scale budget cuts.

the Week in Metalworking

ENGINEERING & PRODUCTION

HOT-COLD WORK IMPROVES 16-25-6 ALLOY—P. 123
Jet engines offer a wider field for application of 16-25-6 chrome-nickel-moly steel alloy developed during World War II. Now, reliable long time test data are available for the design engineer. Results of extended 10,000 hr creep tests made under varying heat treatments are described.

HEAT-TREATING SETUP SPEEDS PRODUCTION—P. 128
Installation of new heating and quenching equipment eliminates slow and expensive pinion straightening operations. Previously, almost every pinion-and-shaft unit had to be straightened to within 0.002-in allowable tolerance for bearing surfaces. Now, 3 pct require straightening and 75 pct fewer are scrapped.

COPPER ALLOY RESISTS STRESS-CORROSION—P. 131
A new copper-nickel-silicon alloy developed by metallurgists of General Electric Co. and Revere Copper & Brass, Inc. shows high resistance to stress-corrosion failure. Critical amounts of iron added to the Cu-Ni-Si alloy gave improved properties. It has excellent properties in sand cast and hot-forged parts.

STRESS-RUPTURE OF TITANIUM IS PLOTTED—P. 134
Creep rupture behavior of annealed titanium in air is complex. Surface treatments and test atmosphere are important especially in small cross section test bars due partly to the alloying of titanium with oxygen and nitrogen. Such reactions improve the rupture life of titanium at temperatures above 900° or 1000°F.

RADIANT GAS REDUCES ANNEALING TIME—P. 140
Fast heat with radiant gas above the critical temperature has replaced salt bath annealing at one shop. Reduction in heating time from 1 hr to 2 min permits higher production rates of 81 mm mortar shells. The annealed hardnesses obtained by the new method are similar to those produced by salt bath methods.

NEXT WEEK—BAR POINTER RAISES SPRING OUTPUT
Addition of a comparatively simple mechanical bar handling and roll feeding device has increased production and cut rejects of pointed steel bars for coil springs in Chrysler-made cars. In addition to providing relief from a monotonous, fatiguing job, the device has improved quality control on the job.

MARKETS & PRICES

HAS SCHUMAN STEEL POOL PLAN HIT A SNAG?—P. 69
The Schuman Plan to pool Europe's steel resources has been free-wheeling through international difficulties at a surprising clip. Now it may have run into a hidden roadblock. A distribution plan based on geographical location is being hurt by customer demand for steel from specific producers.

PLASTICS VIE FOR NEW CONSUMER MARKETS—P. 74
Plastic molders are using bigger presses and dies to hike output of TV cabinets. They are also eyeing the appliance field and other markets traditionally held by steel and wood. Producers will start an educational program to inform manufacturers on plastics possibilities and limitations.

FUTURE WESTERN STEEL DEMAND LOOKS GOOD—P. 91
Population growth and mounting freight rates should assure the future of western steel. W. J. McClung, Bethlehem Pacific vice-president, spelled out these factors at last week's San Francisco regional meeting of American Iron and Steel Institute. He emphasized that 11 western states use 13.5 million tons of steel.

HOPE FOR BETTER BREAK ON RENEGOTIATION—P. 93
Machine tool builders hope that better understanding by Washington of their problems will mean less strict renegotiation proceedings, according to A. G. Bryant, chairman of NMTBA's committee on renegotiations. Speaking at the group's annual meeting, he warned of lowered sales, foreign competition.

STEEL CONTINUES RECORD PRODUCTION PACE—P. 155
Record output of steel continues to find a welcome home among consumers. At warehouse level, stocks are still badly out of balance, though overall inventory is climbing slowly. Some easing is noted on specialty items and narrow strip. Heavy plates and structurals and oil country goods are tightest.

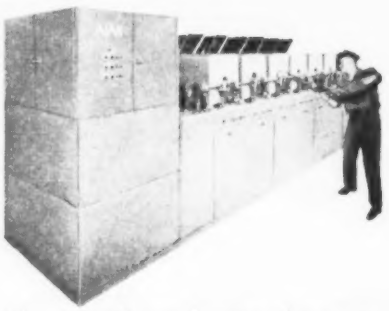
LEAD PRICES HIGHER IN STRONGER MARKET—P. 158
Both lead and zinc continued with firm market undertones but only lead moved upward in price. British government stocks of zinc will be disposed of gradually. Expect lighter impact on world prices. Industry still wants copper price controls eliminated. Wire and cable makers ask hike in ceilings.

Where Production And Precision Count

AUTOMOTIVE FORGINGS

CONNECTING RODS

PINION BLANKS



New Ajax-Northrup heater for automotive work has 8 heating stations, 30 interchangeable heating units. Heats billets from one to four inches, rounds or squares, to 2250°F at rate of 7500 to 8500 pounds per hour.

TRANSMISSION GEARS

AXLE SPINDLES

133

USE AJAX-NORTHRUP INDUCTION HEAT

Here's proof of Ajax-Northrup's ability to do the *tough* jobs . . . long run, high speed forging to exacting specifications.

The *connecting rod* billets are press-forged to a tolerance of 2 *ounces*. Smaller billets and elimination of scale give steel savings up to 20%. Production is increased 40%.

Ten tons of steel a day are saved by forging the *axle spindles* with improved methods based on scale-free induction heat. 16 men do the work of 46, and better fiber flow increases fatigue resistance of finished forgings by 17%.

The story's the same for gears, shafts, and countless other Ajax-heated forgings: Better forgings, at lower overall costs, with less steel. Call on our 35 years of induction heating experience—write us today.

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No. 116 of a Series of Typical Installations

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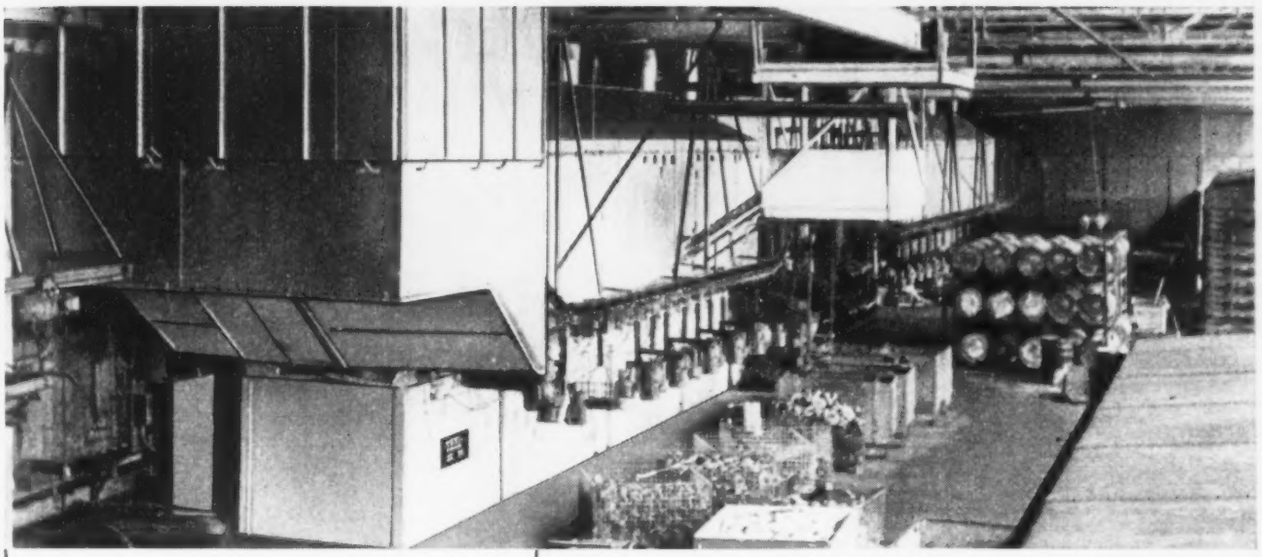
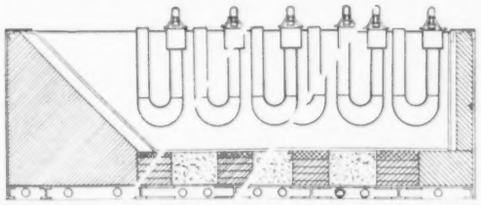
HOW SUNBEAM INDUSTRIAL FURNACES MEET THE DEMANDS ON THE PRODUCTION FRONT

SIMULTANEOUSLY ANNEALING, DESANDING AND DESCALING CASTINGS



PLAN VIEW— ANNEALING, DESANDING AND DESCALING INSTALLATION



This Sunbeam Stewart Salt Bath furnace has a pot 41 ft. long by 4 ft. wide by 4 ft. deep. Forty U-shaped immersion heating tubes, each equipped with a pressure burner of the flame retention type having an individual pilot burner, provide the necessary heat and control for maintaining the bath at proper working temperature. Burners are arranged in three temperature control zones extending the length of the furnace to assure uniform heating throughout the entire length of the bath.

To economically prepare automotive housings for final fabrication, one large manufacturer of automotive equipment required a molten caustic bath capable of descaling, desolving all embedded foundry sands, while providing a stress relieving and softening annealing cycle. By combining these operations into one completely automatic unit, it was possible to eliminate separate installations, overcome additional handling costs and reduced floor area.

Handling of castings is completely automatic from the loading of as-received work from box-cars through the entire process. Time and cycle is approximately 4½ minutes in the salt. Temperature is usually between 1100° and 1200°F., depending upon the characteristic of the work.

Although this particular installation is used primarily for castings, this equipment will successfully handle forgings, hot headed bolts, wire and wire products, etc., where scale must be removed before the product is completed. This design is available covering practically all types and sizes of work in both the continuous and batch type systems.

IF YOU ARE CONSIDERING DEFENSE WORK CALL SUNBEAM. Designs are available for heat treating the following materiel:

SHELLS: 57MM; 75MM; 90MM; 105MM; 120MM; 155MM; 3", 5", 6", 8" Navy Shells (Harden, Quench and Draw).

FORGINGS: Rotary Hearth and Pusher-type Forging Furnaces.

ARMOR PIERCING SHOT (Harden, Quench and Draw).

CARTRIDGE CASES (Anneal, Stress Relieve).

MACHINE GUN CLIPS (Harden, Quench and Draw).

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A letter, wire or 'phone call will promptly bring you information and details on SUNBEAM industrial furnaces, either units for which plans are now ready or units especially designed to meet your needs. Or, if you prefer, a SUNBEAM engineer will be glad to call and discuss your heat treating problems with you.

SHARON STEEL

Ten-year road test proof of '430' Stainless dependability

● Here's a shining example of what you can expect when you use Sharon "430" Stainless Steel in your product. This section of automotive moulding has been subjected to the grime and acids of the highway in all kinds of weather for more than 10 years. Yet, when a damp cloth, soap and elbow grease were applied, it immediately regained its original luster.

Proof of this kind is the reason why today many hundreds of thousands of cars on the highway are trimmed with "430" Stainless. Sharon "430" has been used for this type of product for over 15 years.

Sharon "430" Stainless is in good supply. It has been used with great success in hundreds of tough applications.

SHARONSTEEL

Get the whole story—ask y Sharon representative or w today for fully explanat "430" Stainless brochure.

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Don't Be Taken In

JOSEPH STALIN and his cohorts know more about us than we know about them. He and his gang have a single purpose; all their machinations further a central idea. No act is too ruthless for them if it leads to world domination.

Except for those who died and those close to them, Americans suffered little during two World Wars and the current Korean War. The vast majority of Americans were and are untouched by war.

Free European and Asiatic countries did suffer. Their homes were bombed, their factories gutted and their hopes dashed. Many of their people are so low in spirit that they fail to see the real threat of Russian domination—some of them don't seem to care. Some are so intent on survival they fail to see the menace of anything else.

Stalin knows this. He knows too that when the chips are down we will die for freedom—and Americans are proving this in Korea. We are best known abroad for material progress: we are not well known for our moral courage which is sometimes obscured abroad by petty frictions. But when called upon to show this courage we deliver always. Yet we do a poor job of letting other people of the world see that side of our nature.

If Russia can escape it she doesn't want a world war to gain world domination. Stalin wants to take a much easier road: like a schism between strong democratic nations, a depression in the free world or a loss of hope. He will strike where we are weakest.

Americans are facing a big barrage of propaganda. Its purpose is to split us from England, France and other allies. A product of the Kremlin's latest meeting, this aim will be incessantly and cleverly exploited and it may be partly effective. If it succeeds substantially we are done for.

No matter what the gripe, we must look at our great allies as we do our families. We will have differences of opinion. We will use strong words. We should have table-thumping arguments to understand each other better. But we must never forget that the bonds between us and our allies are freedom, integrity and humaneness.

No matter what our differences are we should remember that Stalin and his successors want to create doubt and suspicion where loyalty and confidence now exist. Let's not be taken in.

Tom Campbell

Editor

Cost of Handling Steel Bars Cut in Half *with* BAKER TRUCK

JONES & LAUGHLIN DETROIT WAREHOUSE USES CRANE TRUCKS AND PORTABLE RACKS FOR MORE EFFICIENT HANDLING AND STORAGE

★ Specially designed portable sectional racks for storing steel bar and rod stock plus the use of a BAKER Crane Truck have cut handling costs by one-half at the Jones & Laughlin Steel Corporation's Detroit Warehouse. This stock was formerly stored by hand in upright position, requiring laborious manual handling. Even with overhead cranes, considerable hand labor was necessary. Previous to the purchase of the truck and the installation of the portable racks, Jones & Laughlin used 6, 8, or more men to pile steel and fill orders. The entire operation is now handled by three men.

With the Baker Crane Truck and sectional storage racks, costs have been halved—and the crane truck still has time to handle steel packs—a further saving not anticipated when it was purchased.

Illustration shows the BAKER Crane Truck handling steel bars stored on sectional racks set at 45° angles in 15 x 15 foot bays.

Documented Case History of Baker Truck savings for Jones and Laughlin is available. Use coupon below.

The Baker-Raulang Company
1227 West 80th Street, Cleveland 2, Ohio

Please send me case study report No. 3051 showing savings with Baker Truck at Jones & Laughlin.

Name ..... Title .....

Company .....

City ..... State .....

Baker
INDUSTRIAL TRUCKS

Dear Editor:

Letters from readers

The Customer Is Back

Sir:

Your Nov. 6 editorial "The Customer Is Back" is very timely indeed.

We wonder if reprints of this are available and, if so, would like very much to have 200 copies for distribution through our organization.

S. A. BROOKS

United Conveyor Corp.
Chicago

Can You Help?

Sir:

We have recently seen a foot operated squaring shear, 40 in. x ⅛ in. capacity. The shear bore the name "Kutscheid."

We are unable to discover the manufacturer of this shear. If you have any information will you please advise us.

C. M. TOWNE
Plant Manager

The Village Blacksmith Co.
Watertown, Wis.

Perhaps one of our readers may be able to help you.—Ed.

Standards

Sir:

The dangers arising from misapplied standardization, as noted in your Oct. 2 article "Standards: Can They Be A Curse?", are by no means exaggerated.

There is little justification for standardization unless, as a result, there is established the possibility of a better and/or cheaper product.

The growing dangers illustrated by you have been forcibly brought to my notice on fairly extensive world travel. Trade barriers are being created of a far more restrictive and devastating type than either straight tariffs or quotas.

If such standards are applied to consumer goods, in a detailed and specific form, then not only do the dangers envisaged multiply but a bar is imposed on all new ideas and progressive technique.

International action between governments was always possible with tariffs and quotas. With standards which are largely being developed into the statutory field this is not the case. In this country, government directives to local authorities call for their general adoption in their bylaws which have the force of law. This principle risks being copied by other countries, eliminating the exchange of goods and commodities.

If a standard has any economic value it will be generally adopted because of its virtue without statutory pressure.

Unfortunately standardization is being developed as an end in itself instead of the means to an end. Its conduct is fast becoming a vested interest with large staffs to be kept employed. This can only be done by pumping out a succession of new standards which become more and more restrictive.

P. G. DONALD
Chairman

Rowanson, Drew & Clydesdale, Ltd.
London, England

Powdered Metal Properties

Sir:

We have noted on p. 101 of your Nov. 6 issue the following statement:

"Properties of steel from powder metal will be possible soon. A new powdered metal product will have tensile strength of low carbon steels, high ductility, can be hardened by cyaniding, case hardening."

We have requirements for such powder metal parts and we would be very much interested if you would supply us with additional information which will enable us to follow up this lead.

R. D. ARMSTRONG
Buyer

Detroit Diesel Engine Div.
General Motors Corp.
Detroit

For more details about this new product write to the Oilite Div., Chrysler Corp., Detroit.—Ed.

Packaging Methods

Sir:

In the Mar. 27 issue there is an article on p. 101 titled "Packaging Methods—Cuts Costs, Saves Space." In this article it is stated that it could be used for the packaging of oil.

I would be thankful for further information and details concerning the above mentioned article.

G. J. McKEEVER

Esso Standard Oil Co.
Baltimore

For further information on these packaging methods write to John Hooper, 49 Wellington St., Strand, London, W.C.2, England.—Ed.

Metals for Tomorrow

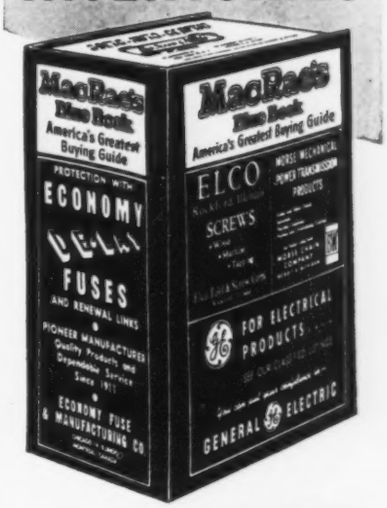
Sir:

We would appreciate receiving five tear sheets of the following articles: "Metals for Tomorrow," Part I, Oct. 9, p. 259 and "Armor Plate Quenched Rapidly, Uniformly in Hydraulic Press," Oct. 16, p. 97.

E. L. LEWIS

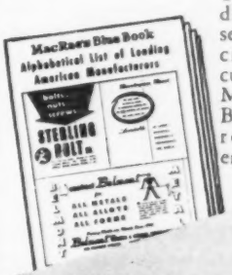
Drever Co.
Philadelphia

PRIME MOVER of INVENTORIES



INDUSTRY'S "WORKHORSE"
Invites advertisers into its 60th edition

Next year, the 60th consecutive annual edition of MacRae's Blue Book will again produce top-quality inquiries for the thousands of advertisers who will describe their products in this most-favored, most accessible of industrial directories. Shouldn't you have the details of its pulling power?



This handy address directory, at left, sent free to all recipients of the current edition of MacRae's Blue Book, has been received with enthusiasm.

For single copy costs and advertising rates, write

MacRAE'S BLUE BOOK
America's Greatest Buying Guide
18 East Huron St., Chicago 11, Ill.

STANDARDS and SPECIALS by the Millions

THE FERRY CAP & SET SCREW CO.

2187 SCRANTON ROAD • • • CLEVELAND 13, OHIO

"SHINYHEADS"

America's Best Looking Cap Screw

Made of high carbon steel — AISI C-1038 — to standards for Full Finished hexagon head cap screws — bright finish. Heads machined top and bottom. Hexagon faces clean cut, smooth and true, mirror finish. Tensile strength 95,000-110,000 p.s.i. Carried in stock.

"HI-CARBS"

Heat Treated Black Satin Finish

Made of high carbon steel — AISI C-1038. Furnished with black satin finish due to double heat treatment. Hexagon heads die made, not machined. Points machine turned; flat and chamfered. Tensile strength 130,000-160,000 p.s.i. Carried in stock.

"LO-CARBS"

Made of AISI C-1018 steel — bright finish. For use where heat treatment is not required and where ordinary hexagon heads are satisfactory. Hexagon heads die made to size — not machined. Points machine turned. Tensile strength 75,000-95,000 p.s.i. Carried in stock.

SET SCREWS

Square head and headless — cup point. Case hardened. Expertly made by the pioneers in producing Cup Point Set Screws by the cold upset process. Cup points machine turned. Carried in stock.

FILLISTER CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

FLAT HEAD CAP SCREWS

Heads completely machined top and bottom. Milled slots — less burrs. Flat and chamfered machined point. Carried in stock.

"SHINYLAND" STUDS

All studs made steam-tight on tap end unless otherwise specified, with flat and chamfered machined point. Nut end, oval point. Land between threads shiny, bright, mirror finish. Carried in stock.

ADJUSTING SCREWS

Valve tappet adjusting screws — Hexagon head style — to blue print specifications — hexagon head hard; polished if specified — threads soft to close tolerance — points machine turned; flat and chamfered.

CONNECTING ROD BOLTS

Made of alloy steel — heat treated — threads rolled or cut — finished to extremely close thread and body tolerances — body ground where specified. Expertly made by the pioneers in producing connecting rod bolts by the cold upset process.

SPRING BOLTS

Case hardened to proper depth and ground to close tolerances. Thread end annealed. Supplied in various head shapes, with oil holes and grooves of different kinds, and flats accurately milled.

FERRY PATENTED ACORN NUTS

For ornamental purposes. Steel insert — steel covered. Finish: plain, zinc plated, cadmium plated. Size: 9/16", 3/4", 15/16" across the flats.

Tapped 1/4" to 3/4" inclusive. Cross section of Ferry patented acorn nut, showing how steel hexagon nut fits snugly into shell.

Pioneers and Recognized Specialists, Cold Upset Screw Products since 1907

STANDARDS carried by LEADING DISTRIBUTORS

* **SPECIALS** furnished to BLUE PRINT SPECIFICATIONS

WRITE FOR INFORMATION

SEND FOR SAMPLES

Fatigue Cracks

by William M. Coffey

Is This Progress?

Modernization has finally caught up with the ancient and honored Wedding Anniversary List. As recently published by the Jewelry Industry Council, it now looks like this:

1st, Clocks; 2nd China; 3rd, Crystal and Glass; 4th, Electrical Appliances; 5th, Silverware; 6th, Wood; 7th, Desk Sets; 8th, Linens and Laces; 9th, Leather; 10th, Diamond Jewelry; 11th, Fashion Jewelry; 12th, Pearls-Colored Gems; 13th, Textiles and Furs; 14th, Gold Jewelry; 15th, Watches; 16th, Silverware; 17th, Furniture; 18th, Porcelain; 19th, Bronze; 20th, Platinum; 25th, Sterling Silver; 30th, Diamond; 35th, Jade; 40th, Ruby; 45th, Sapphire; 50th, Gold Hollowware; 55th, Emerald; 60th, Diamond Watches, Compacts, etc.

Who goes around sneaking in things like clocks, washing machines and desks sets? Why not shoe horns, radar, hot water bottles or bull rings? And what's the matter with molybdenum, vanadium and silicon? We think a new committee should tackle this whole problem and report back.

Reader Service Department

Note to Mr. J. H. Kittinger of Chicago: Free copies of The Iron Age must be accompanied by 35¢. Note to Mrs. Helen Osborne of Cleveland: No, madam, you will find nothing in The Iron Age to explain why your husband's beriberi still drags on. Note to Mr. J. C. Reichter of Cincinnati: No sir, we have no restrictions whatever as to the use you wish to make of our coming giant-size, 600-page Annual Yearbook issue. It will not, however, be exactly like the Sears-Roebuck catalog.

Is This Progress, Too?

Ultrasonic ageing of whisky has been attempted, and the results are claimed to be good. The subtle chemical process that takes place during years of ageing can, it is said, be cut to a matter of hours. One German distillery and two Rhenish wine companies have already installed high-frequency ultrasonic plants for ageing. "Charles, make sure it's the 10 o'clock vintage."

Is This Progress, Three?

Titanium is achieving full military utilization. Word has been received from our searching Washington staff that at least one General, with an eye to the future of metals, has ordered a set of titanium stars. This should set a new high in military ruggedness, and brings up the question, "which will survive longer, the general or his shoulder insignia?" We need that man.

Puzzles

Old-time puzzle stand-by E. A. Schwab of Emerson Corp., N. Y. C. crashed through again with the right answer to the gambler puzzle —as also did W. Clay Babcock, Process Engineer with the Kimble Glass Company of Toledo.

. . . and some more fine-type winners who hit the bell on the numbers problem: R. W. Hautzenroeder of Harry Ferguson, Inc., again Mr. Schwab, and Clarke Redfield of Eclipse-Pioneer.

Remember the castaways and the coconuts? The correct answer is: 1,020 coconuts left in the morning. And winners, so far, are L. D. Rice of Timken and George Pascoe of the Ford Motor Company. Bob Lofy of Evinrude Motors zigged when he should have zagged, so am sending him Mr. Pascoe's detailed calculation.

New Puzzle: Mr. Thomas B. Hudson, Jr., of Albert Curry & Co., Pittsburgh, offers a box of 25 cigars to the man who sends in the first correct solution to this:

One 40 foot ladder and one 20 foot ladder are braced between two upright walls, so that they cross at a point 10 feet above the ground. What is the distance between the walls?

Smoke cigars, Mr. Schwab and Mr. Rice? We'll watch the postmarks.

Headquarters for

52100

Steel Tubing and Bars

New Headquarters of Peterson Steels, Inc. Union, New Jersey

Largest Stocks in the Country...

of this versatile steel. 52100 is hard, tough and long-wearing, yet it's easy to machine and is right for bearings, sleeves, pins, collars and many other machine parts.

Over 200 seamless tube sizes to choose from .898" O. D. to 8.250" O. D. Bar sizes from .171" round to 7.5" round. Also ring forgings in any analysis.

Write for our Latest Stock List Now

PETERSON STEELS, INC.

DEPT. I, SPRINGFIELD ROAD

UNION, NEW JERSEY

Detroit, Mich • Chicago, Ill.

Instant Automatic Flow and Shut-Off

Quick Connection and Disconnection

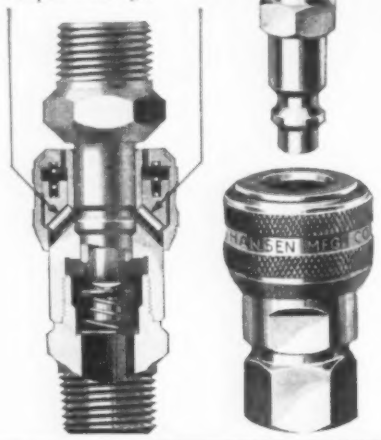
WHY *Genuine* HANSEN COUPLINGS GIVE BETTER SERVICE LAST LONGER

LEAK-PROOF, Minimum Wear Locking Device

Integral Factory-Assembled Tamper-Proof Socket Head

PICK GENUINE HANSEN COUPLINGS FOR HANSEN PERFORMANCE...

Locking pins in Hansen Push-Tite Coupling Socket afford large area contact with plug, thereby preventing wear and subsequent leakage.



● The ability of Hansen Push-Tite Couplings to withstand severe service – with practically no maintenance – has been thoroughly proved by years of hard everyday use in thousands of plants. The "socket head", which contains the locking device, is factory assembled into a rugged integral unit which cannot be readily injured or have component parts lost by casual tampering.

To connect the coupling, you merely push the plug into the socket with one hand. Flow is instantaneous. To disconnect, push back sleeve on socket – coupling disconnects. Flow is shut off instantly and automatically.

Write for catalog giving complete range of types and sizes.

QUICK CONNECTIVE FLUID LINE COUPLINGS *for*
AIR • OIL • GREASE • HYDRAULIC FLUIDS
WATER•VACUUM•STEAM•OXYGEN•ACETYLENE
REFRIGERANTS • GASOLINE • COOLANTS

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THE HANSEN MANUFACTURING COMPANY

4031 WEST 150th STREET • CLEVELAND 11, OHIO

Conventions & Meetings

Nov. 19-21—**American Management Assn.,** Finance Conference, Hotel Roosevelt, New York. Association headquarters are at 330 W. 42nd St., New York.

Nov. 20-21—**American Society for Quality Control,** mid-West Conference, Claypool Hotel, Indianapolis.

Nov. 21—**Malleable Founders Society,** Western Section meeting, The Drake, Chicago. Society headquarters are at Union Commerce Bldg., Cleveland.

Nov. 28-30—**Grinding Wheel Institute,** annual meeting, Hotel Statler, Buffalo. Association headquarters, P. O. Box 64, Greendale, Mass.

Nov. 30-Dec. 5—**American Society of Mechanical Engineers,** annual meeting, Statler Hotel, New York. Society headquarters are at 29 W. 39th St., New York.

Dec. 2—**National Warm Air Register Manufacturers Institute,** annual meeting, Cincinnati. Institute headquarters are at 5 E. Long St., Columbus, Ohio.

Dec. 2—**Spring Manufacturers Assn.,** annual meeting, Biltmore Hotel, New York. Association headquarters are at 249 Main St., Bristol, Conn.

Dec. 2—**Society of Automotive Engineers, Inc.,** Hotel Statler, New York. Society headquarters are at 29 W. 39th St., New York.

Dec. 3-4—**National Warm Air Heating & Air Conditioning Assn.,** annual convention, Sheraton-Gibson Hotel, Cincinnati. Association headquarters are at 145 Public Square, Cleveland.

Dec. 3-5—**Society for Experimental Stress Analysis,** fall meeting, Hotel McAlpin, New York. Society headquarters are at Central Square Station, Cambridge, Mass.

Dec. 3-5—**National Assn. of Manufacturers,** Congress of American Industry Waldorf-Astoria, New York. Association headquarters are at 14 W. 49th St., New York.

Dec. 4-5—**American Institute of Mining & Metallurgical Engineers,** Electric Furnace Steel Committee, Iron & Steel Div., annual conference, Hotel William Penn, Pittsburgh. Institute headquarters are at 29 W. 39th St., New York.

Dec. 7-10—**American Institute of Chemical Engineers,** annual meeting, Hotel Cleveland, Cleveland. Institute headquarters are at 120 E. 41st St., New York.

1953

Jan. 21—**American Boiler Manufacturers Assn. & Affiliated Industries,** mid-winter meeting, Hotel Cleveland, Cleveland. Association headquarters are at 1571 W. 117th St., Cleveland.

Jan. 21-22—**Steel Shipping Container Institute,** winter meeting, Hampshire House and Hotel Pierre, New York. Institute headquarters are at 600 Fifth Ave., New York.

Jan. 26-27—**Compressed Gas Association, Inc.,** The Waldorf-Astoria, New York. Association headquarters are at 11 W. 42nd St., New York.

Feb. 16-19—**American Institute of Mining & Metallurgical Engineers,** annual meeting, Statler Hotel, Los Angeles. Institute headquarters are at 29 W. 39th Street, New York.

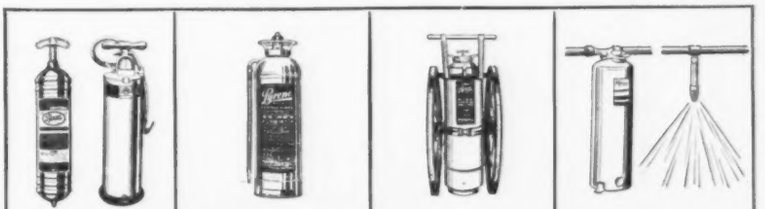
Pyrene
REG. U.S. PAT. OFF.

NO MATTER HOW CAREFUL YOU ARE YOU'RE SAFER IF YOU HAVE PYRENE

There's a Pyrene for every fire hazard

The *best time* to buy complete fire protection is *in time.* And the best protection money can buy is Pyrene.* Whatever the fire hazard, there's a Pyrene to cope with it—for Pyrene makes everything from hand extinguishers to complete automatic fire-fighting systems.

*T.M. Reg. U.S. Pat. Off.



Vaporizing Liquid Always dependable, multi-use extinguisher.

Cartridge-Operated For ordinary fires. No annual recharging.

Chemical Foam For flammable liquids, ordinary combustibles.

Systems Large and small, manual and automatic.

Soda-Acid, Pump Tank and other approved extinguishers

PYRENE MANUFACTURING COMPANY

692 Belmont Avenue Newark 8, New Jersey

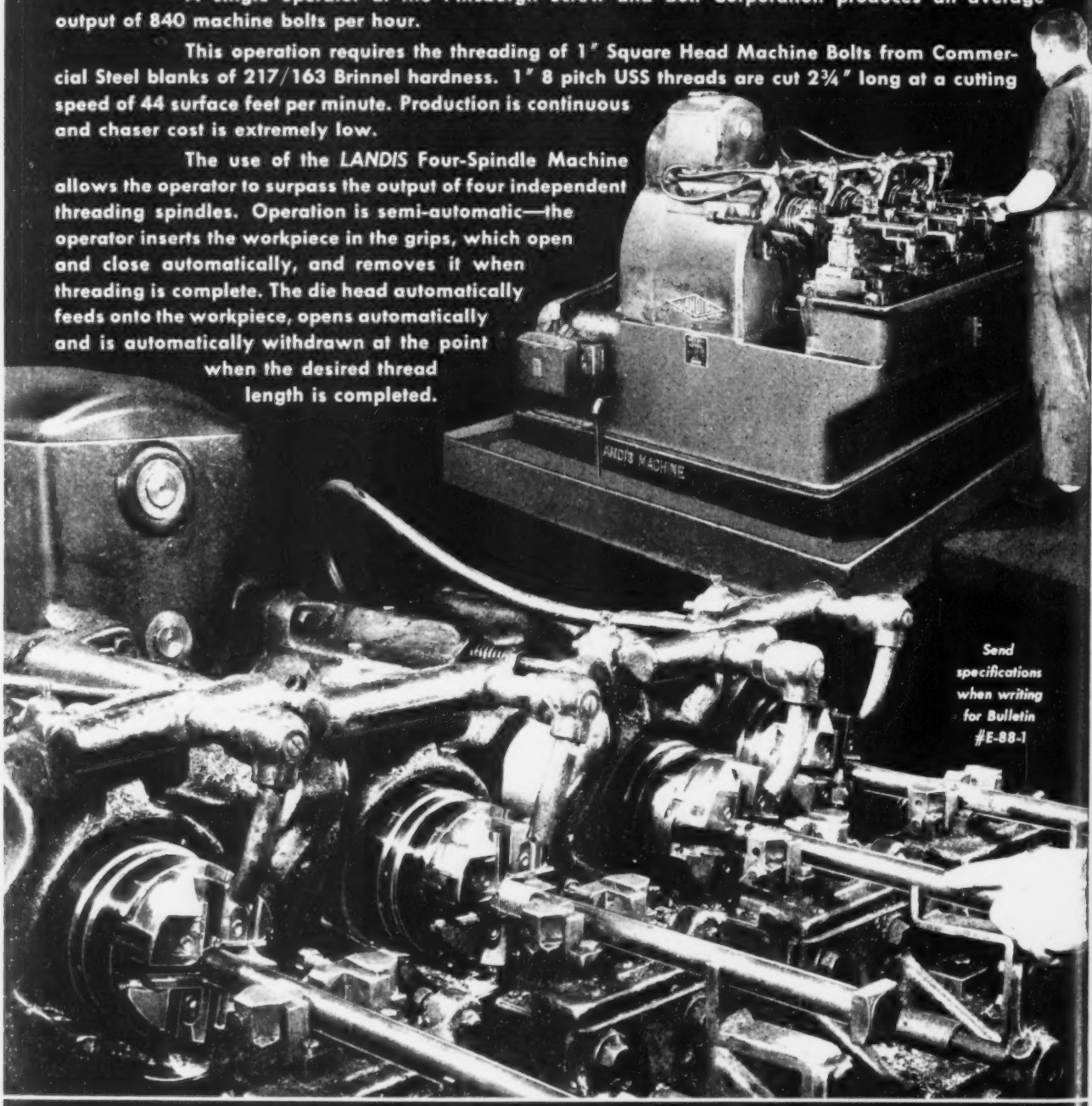
Affiliated with C-O-Two Fire Equipment Co.

One Machine Bolt Threaded Every 4⅓ Seconds... WITH THE LANDIS 4-SPINDLE SEMI-AUTOMATIC THREADER

A single operator at the Pittsburgh Screw and Bolt Corporation produces an average output of 840 machine bolts per hour.

This operation requires the threading of 1" Square Head Machine Bolts from Commercial Steel blanks of 217/163 Brinnel hardness. 1" 8 pitch USS threads are cut 2¾" long at a cutting speed of 44 surface feet per minute. Production is continuous and chaser cost is extremely low.

The use of the *LANDIS* Four-Spindle Machine allows the operator to surpass the output of four independent threading spindles. Operation is semi-automatic—the operator inserts the workpiece in the grips, which open and close automatically, and removes it when threading is complete. The die head automatically feeds onto the workpiece, opens automatically and is automatically withdrawn at the point when the desired thread length is completed.

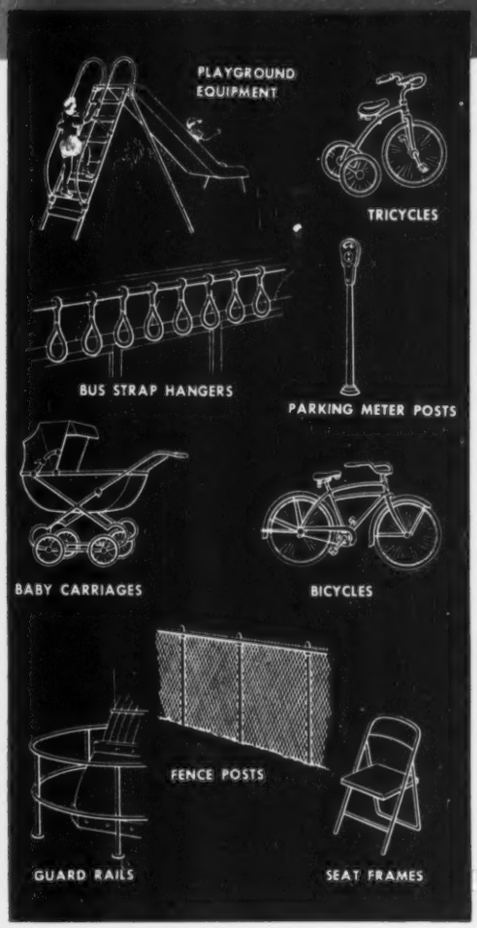


Send specifications when writing for Bulletin #E-88-1

LANDIS *Machine* COMPANY · WAYNESBORO PENNSYLVANIA

You can't beat a tube

FOR STRENGTH WITHOUT WEIGHT



● In proportion to size and weight, a tube is the *strongest structural form you can buy*. That's why you find so much tubing where light weight with strength is important: in furniture and seat frames, bicycles, playground equipment, fence posts, guard rails and hundreds of other everyday items.

Look at these other features: Tubing is *stiff*, has high resistance to torsional and bending stresses. It's easy to transport, fabricate, and erect. Surface area is small, economical to apply paint and other finishes. In *permanent* installations, the light weight of tubing often permits lighter, cheaper and more easily erected substructures.

If you want tubing that has that unbeatable combination of quality and economy, specify NATIONAL Electric Welded Mechanical Steel Tubing. This low-cost commercial quality tubing is available in sizes up to and including 4" OD. It's easy to bend. Easy to form. Easy to weld. The high quality will keep production men and customers happy. And the low cost . . . that'll keep *you* happy!

For information, write to National Tube Division, United States Steel Company, 525 William Penn Place, Pittsburgh 30, Pennsylvania.

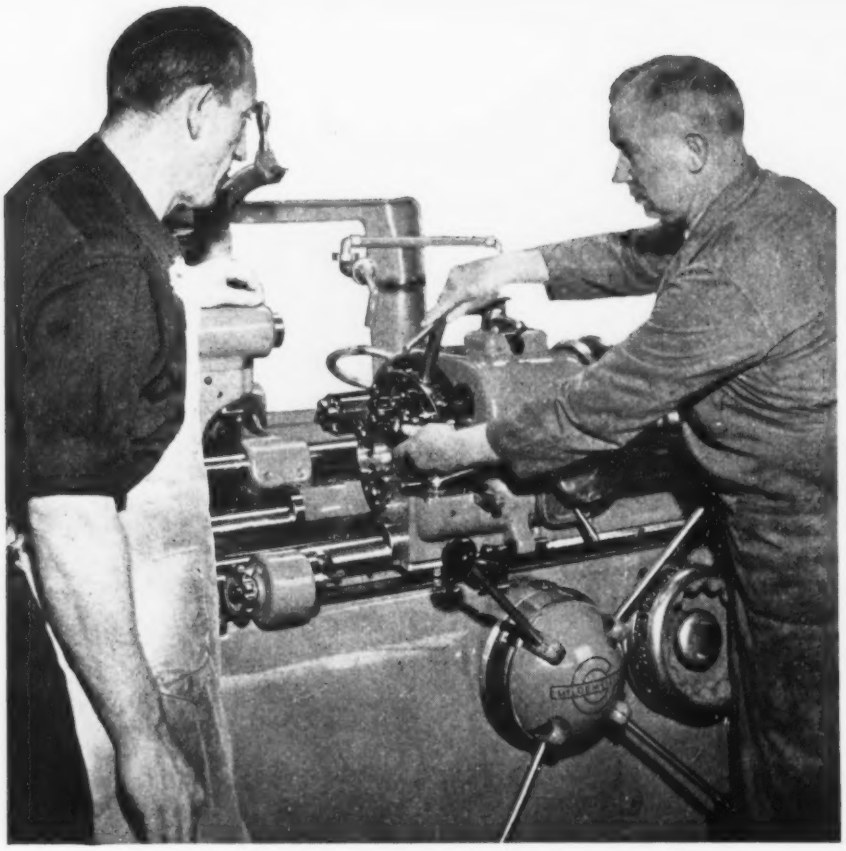
NATIONAL TUBE DIVISION, UNITED STATES STEEL COMPANY, PITTSBURGH, PA.
(Tubing Specialties Division)
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

USS

NATIONAL *Electric Welded* **MECHANICAL**

STEEL TUBING

UNITED STATES STEEL



What kind of Servicing can you expect when you buy German Machine Tools?

MEET A TYPICAL ORBAN SERVICE ENGINEER AT WORK right in a customer's plant, setting up a Gildemeister Turret Lathe at Special Screw Products, Inc., Bedford, Ohio, and instructing operators in its use. Or it might be a Lindner Jig Borer at Ford—a Cawi Grinder at Thompson Products—a Klopp Shaper at Textile Machine Works.

He's typical of a staff of factory technicians permanently stationed at Orban—men who have actually built the machines they install, demonstrate and service.

Three Service Centers

These engineers work out of our service centers in Cleveland, Detroit and Newark, N. J., where replacement parts are stocked for all normal maintenance needs. Where a special part or attachment is needed in a hurry, our direct teletype connection with our Dusseldorf, Germany office can speed it on its way within 24 to 48 hours.

Actually, though, we've found that the hundreds of machines we've installed in major plants from coast-to-coast have needed little or no service attention after installation. In fact, our engineers have been able to devote some of their time and skill to servicing foreign tools purchased elsewhere.

Tools built to American standards

One thing more: Every machine tool we distribute is designed for standard American voltages and frequencies; calibrations and lead screws are in inches. Our written guarantee of materials and workmanship for a period of six months accompanies each machine. Complete operating instructions in English are supplied.

That's what you can count on when you buy machine tools from Orban. Ask us about your requirements.

Send for current stock list

Lathes	Grinders
Milling Machines	Drill Pointers
Jig Borers	Power Hack Saws
Thread Grinders	Screw Machines
Drill Presses	Die Sinkers
Shapers	Slot Millers

KO CO., INC. INDUSTRIAL IMPORTERS

KURT ORBAN COMPANY, INC.

205 East 42nd St., New York 17 • 4220 Prospect Ave., Cleveland 3 • 19450 James Couzens Highway, Detroit 35
1939 Sante Fe Ave., Los Angeles • **Canadian sales by European Machinery Ltd., 11 King St. West, Toronto, Canada**

GARDNER precision disc Grinders

Grinding TWO Parallel Sides of 114 sq. in. Steel Disc In ONE Operation

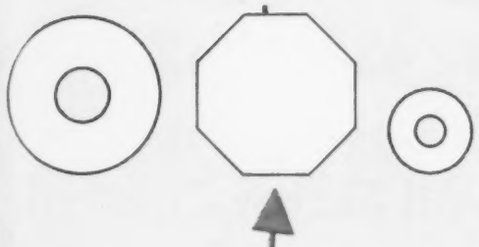
WORK DATA

OPERATION—Grinding parallel sides of test billets to produce finished surface before etching for steel analysis.

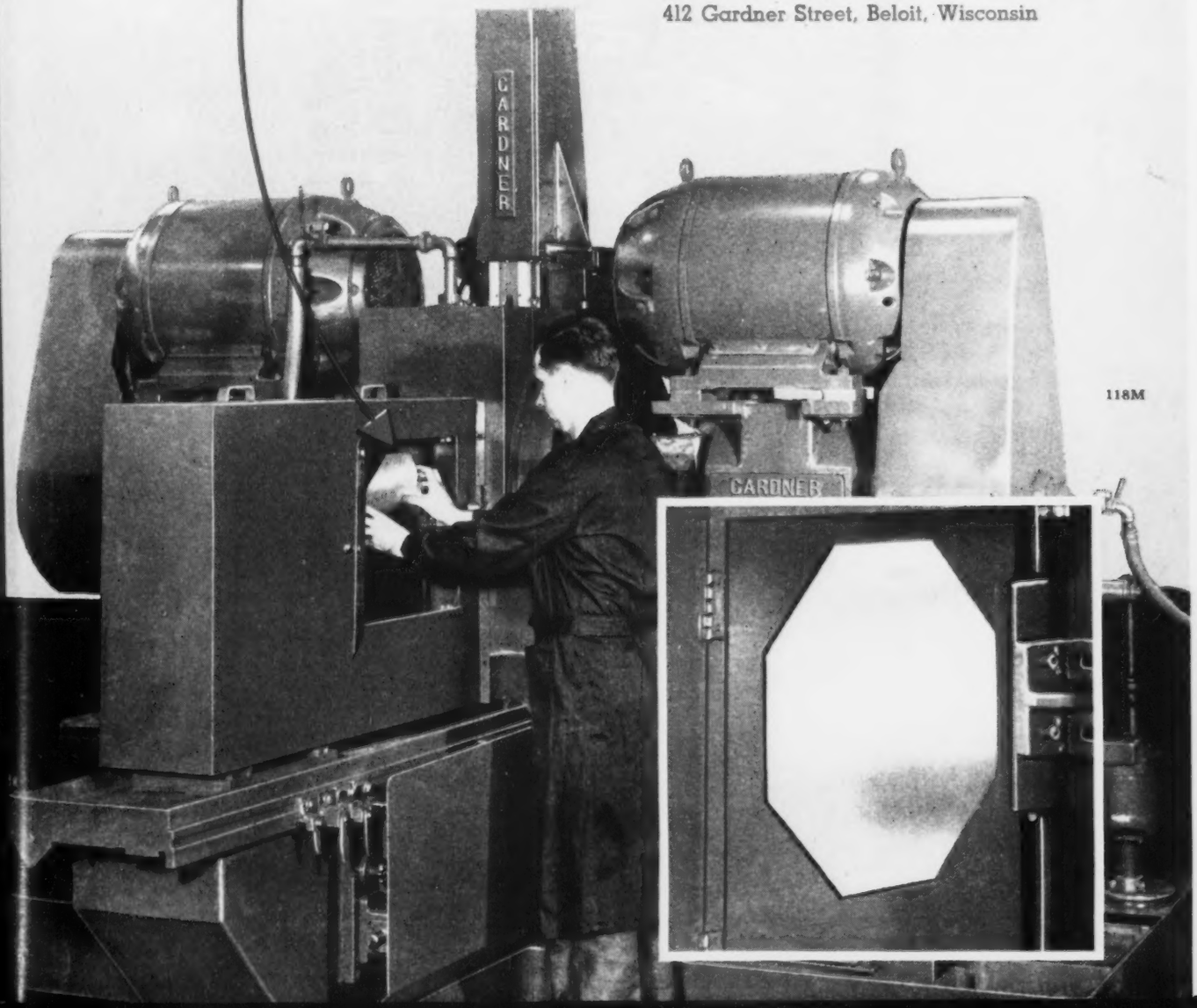
STOCK REMOVAL—3/16" to 1/4" overall.

TOLERANCE—.006" to .008" for uniformity. .003" to .006" for parallelism.

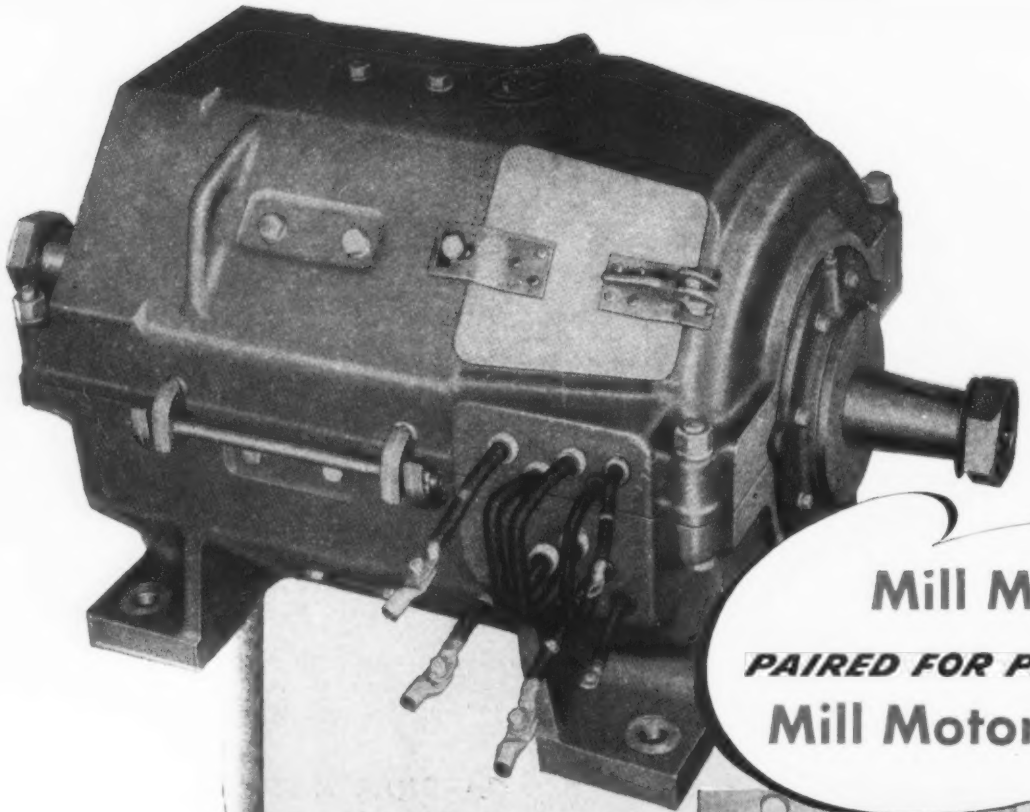
Consult Gardner about your flat surfacing problems. Production estimates and tooling suggestions will be furnished from your work prints.



GARDNER MACHINE COMPANY
412 Gardner Street, Beloit, Wisconsin



118M

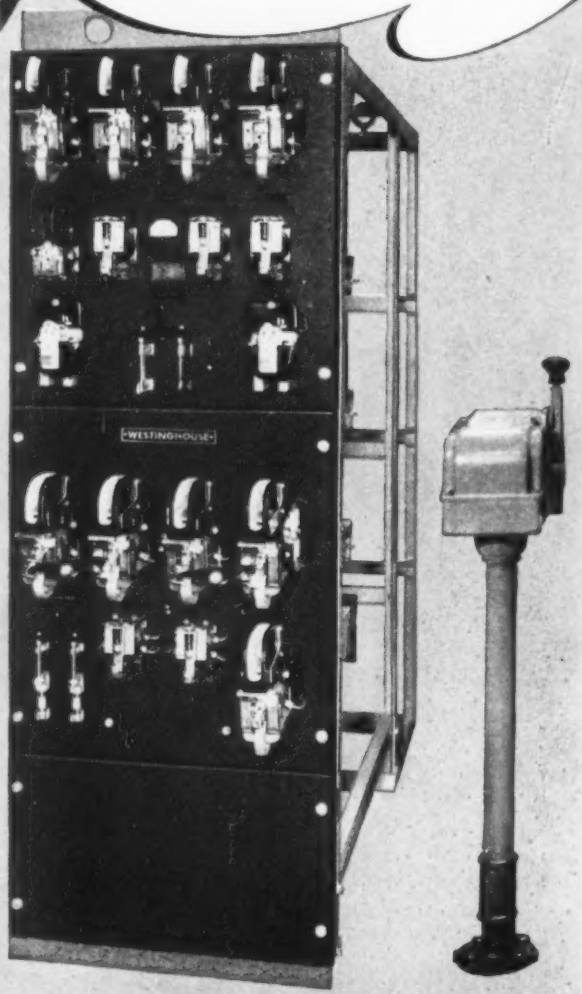


Mill Motor

PAIRED FOR PRODUCTION

Mill Motor Control

600 Series Mill Motor



Typical 9500
Line Controller, Type M
Contactors and Type SM
Master Switch

Rugged!

cut mill down time with this team

Certainly in a mill, where down time costs add up fast, the ability of equipment to stand up to rugged continuous duty is of paramount importance. That's why you'll find this combination hard to beat. They are rugged . . . made together to work together. Each incorporates the latest design features to keep production lines rolling.

Take the motor for example. The high starting torque of this new 600 series mill motor is ideal for high inertia loads . . . proved commutation . . . high rated efficiency assures maximum performance under tough service conditions . . . simplified construction makes servicing and maintenance easy. It is a brand-new motor with a new kind of performance built for today's tougher jobs.

Controllers, too, are built to assure new dependability. Main contactors are the new Type M with knife-edge, trouble-free bearings . . . with exclusive Quick-Quench arc boxes which greatly increase contact life. Overload relays are the dual thermal instantaneous type. Accelerating relays are the time-proved inductive time delay Type AZ.

The third part of this control team is the rugged Type SM master switch. Easy to operate, yet with a definite "feel" for each operating point of position, the switches are available with 2 to 6 speed control.

Together, these three offer a new kind of dependability. Get the facts on all three. Ask your nearby Westinghouse representative for a copy of the new booklet B-4730, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-21647

YOU CAN BE SURE.. IF IT'S

Westinghouse

MILL MOTORS AND CONTROLS

ASSEMBLY LINE FOR MODEL 895 ENGINES. In Lycoming's plant at Williamsport, Pa. Norton Grinding Machines are used in the grinding of components for this engine.

LYCOMING USES 59 NORTON grinding machines on one big engine job

"Lycoming-Built Ordnance Continental Model 895 Engine." That is the official description of the product of the new Lycoming engine factory at Williamsport, Pa.

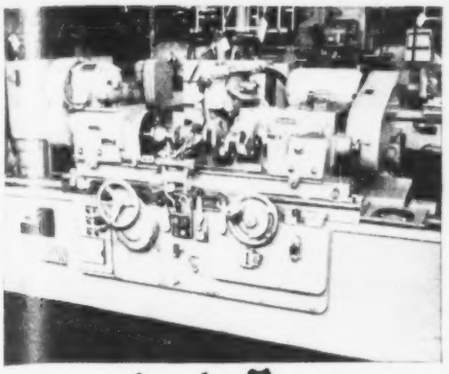
Model 895 is an army tank engine — 6 cylinder, horizontal opposed, air cooled, made in both supercharged and unsupercharged types. For the many grinding operations required to build it, Lycoming engineers selected 59 Norton grinding and lapping machines — an installation worth talking about, worth your serious consideration.

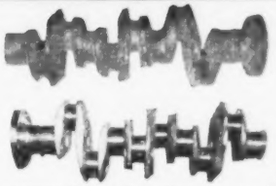
Some of Lycoming's Norton machines and the jobs they do are shown here. Perhaps you have jobs like these. Or perhaps your applications are entirely different. In either case, Norton will be glad to work with you on plans to fit standard or special grinding machines into your present or "post emergency" production.

Remember — only Norton offers you such long experience in both grinding wheels and machines to help you produce more at lower cost.

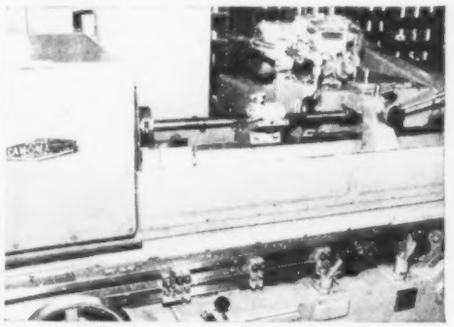
For further information on the world's most complete line of grinders and lappers, see your Norton Representative or write us direct. NORTON COMPANY, Machine Division, Worcester 6, Mass.

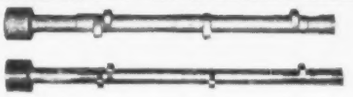
BATTERY OF 17 NORTON MACHINES. This picture shows an installation of seventeen 6" x 18" CTU Semiautomatics used for miscellaneous grinding of 80 different kinds of parts.



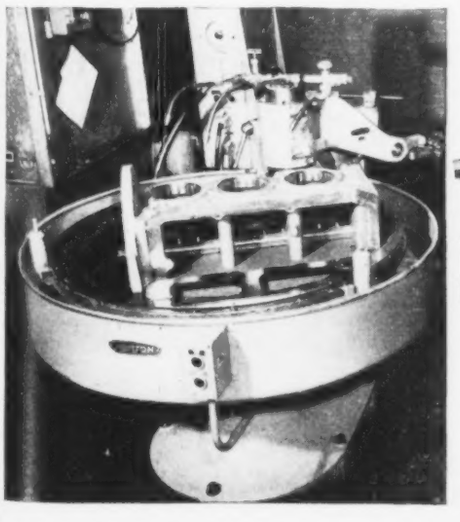


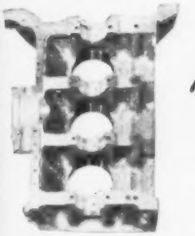
MAIN CRANKSHAFT BEARINGS are finish ground on Norton 14" x 36" LCTU Semiautomatic grinding machines. An interesting detail is that crankshafts are not centered to depth; therefore a base mounted locator is used on each machine. Crankshafts shown as forged and finish ground.





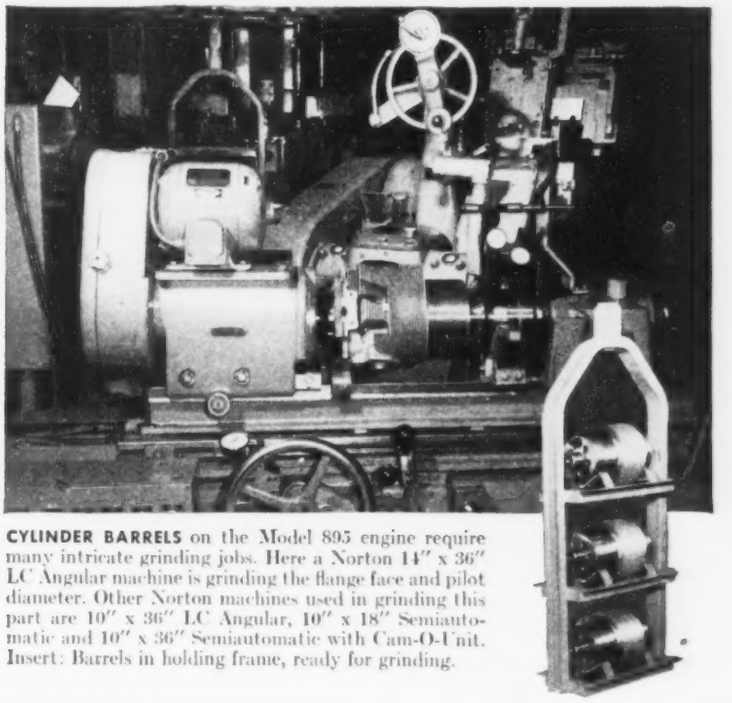
CAMSHAFTS are ground all over, with 3 grinds on the cam contours, all with small diameter wheels because of re-entrant curve. Norton 6" x 30" CTU Semiautomatic and No. 2 Cam-O-Matic machines are used. One of the latter is shown grinding the contours. Model 895 camshafts illustrated, before and after finish grinding.





CRANKCASE JOINT FACES are lapped on Norton No. 2F lapping machines, using 36" bonded abrasive laps. These machines do fast, precise work on soft metals, leaving a flat, clean surface which is free from imbedded lapping compound. View of crankcase shows the lapped surface.

CAST ALUMINUM PISTONS are used in the unsupercharged engine, forged aluminum pistons in the supercharged. All are ground on Norton 10" x 36" CTU Semiautomatic grinding machines, equipped with the compound Cam-O-Unit and the self-contained motor driven truing device which trues the wheel. At right: A Model 895 piston forging and the finished product.



CYLINDER BARRELS on the Model 895 engine require many intricate grinding jobs. Here a Norton 14" x 36" LC Angular machine is grinding the flange face and pilot diameter. Other Norton machines used in grinding this part are 10" x 36" LC Angular, 10" x 18" Semiautomatic and 10" x 36" Semiautomatic with Cam-O-Unit. Insert: Barrels in holding frame, ready for grinding.

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Making better products to make other products better

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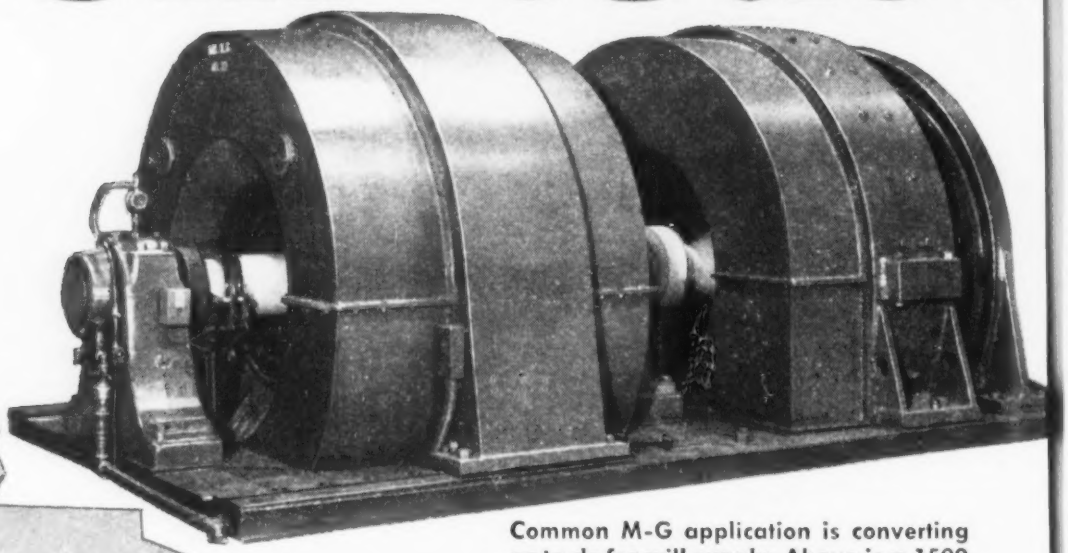
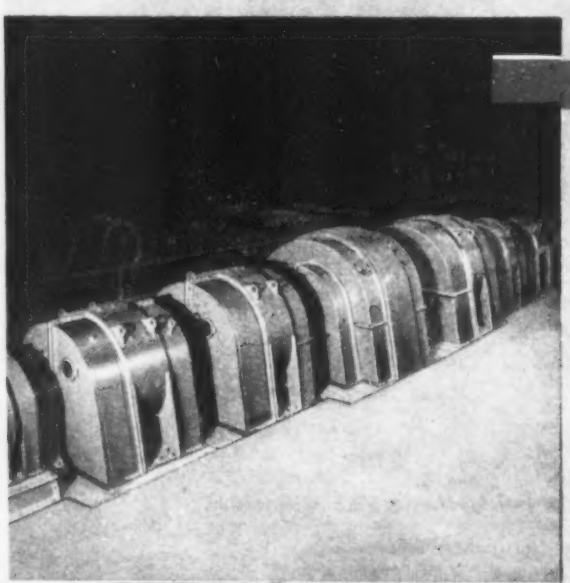


Common M-G application is converting ac to dc for mill supply. Above is a 1500 kw synchronous set in eastern mill.

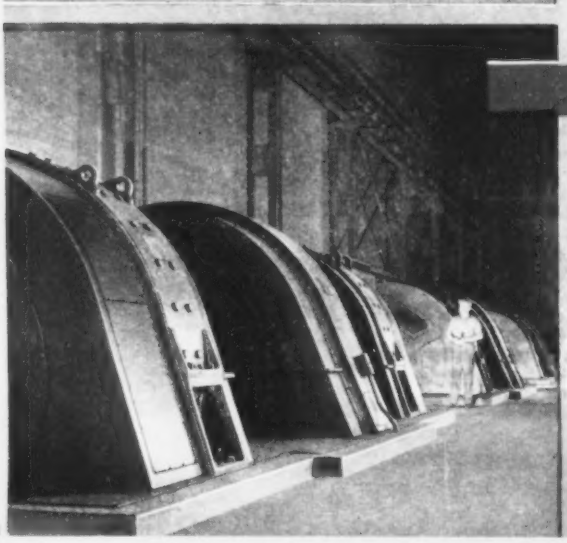


WEST

This 8-machine 2000 kw M-G set supports a two stand, four high tin temper mill with generators opposite their mill motors.

MIDWEST

A 56-inch, four stand tandem cold reduction mill is supported by this 7-machine 7750 kw synchronous motor-generator set.



EAST

Three 3-machine 6000 kw synchronous M-G sets supporting six finishing stand motors in a large East Coast steel rolling mill.

TEMPER MILL

Three midwestern single stand temper mills are supported by these M-G sets. Synchronous motors of 1750 hp drive each set.

to Coast!

ALLIS-CHALMERS M-G SETS ARE WIDELY USED IN SUPPORT OF STEEL MILL DC DRIVES

MAJOR STEEL PRODUCERS from Coast to Coast use Allis-Chalmers motor-generator sets. This nationwide acceptance in heavy duty service is proof of their durability and quality.

These representative M-G sets indicate the wide variety in design and size available. Allis-Chalmers has long experience with steel mill needs — having built M-G sets for all current applications — and will build special for any new requirement that may arise.

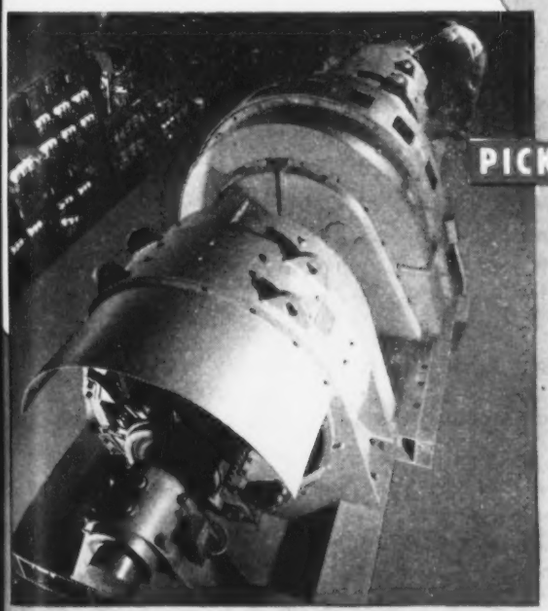
Motor-generator sets give you:

1. Power factor correction.
2. Regenerative braking.
3. Quick starting for emergency demand.

Only Allis-Chalmers gives you M-G sets with the exclusive *Frog-Leg* armature winding that ***eliminates injurious commutator sparking.*** *Frog-Leg* winding connects bars of equal potential through the winding itself . . . producing a perfectly equalized winding without the use of cross-connectors.

For full details on this heavy duty steel mill rotating equipment, ask for M-G Set Bulletin 05B6032A and Large DC Motor Bulletin 05B6002A. For your copies, just call the nearest A-C office or write direct to Allis-Chalmers, Milwaukee 1, Wisconsin. A-3920

Frog-Leg is an Allis-Chalmers trademark.



PICKLING LINE

A pickling line in an eastern steel mill is supported by this 4-machine 1375 kw, 720 rpm synchronous M-G set.

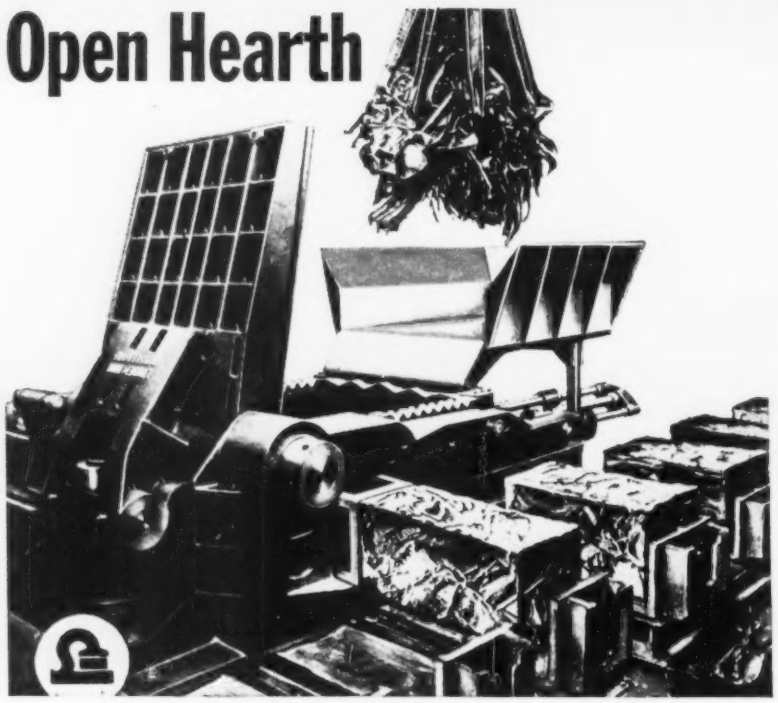
RECORD BREAKER

A motor room, completely equipped by Allis-Chalmers, powered this 80-inch western hot strip mill to a new annual world tonnage record.

ALLIS-CHALMERS

Power, Electrical, Processing Equipment for Iron and Steel

5 to 15% Greater Open Hearth Production...



with Lindemann triple-action "SA" Presses

One *automatically ejected* bale fills entire charging box—steps up open hearth production, cuts down charging, handling and melting costs.

You can press bales as big as 8,800 pounds—large enough to fill the whole charging box with a single bale—when you use a Lindemann Hydraulic "SA" Press. You need fewer boxes—you save charging time.

Large charging opening of the press box allows feeding of very long, bulky scrap. Hydraulically operated hinged lid shears off overhang against patented serrated bars on box edges. *Hinge action increases press box capacity by 40%.*

Bale is automatically ejected into charging box or onto slideway landing—no cranes needed. Large feeding hopper allows filling for next bale during pressing operation—no idle time.

Main cylinders are horizontal, allowing easy access and maintenance. No deep, costly foundation pits are needed.

Press box sizes from 80″ x 71″ x 32″ to 157″ x 177″ x 50″. Bales weights from 900 to 8,800 pounds; rates up to 31 per hour.

LOOK INTO THESE OTHER LINDEMANN PRESSES, *TOO!*

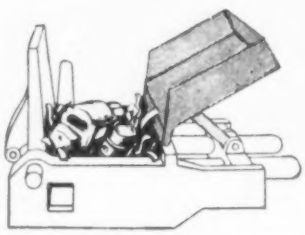
Other Lindemann Lid-Type Presses are designed to meet the needs of electric and blast furnaces, car body works, large metal-working plants, large and small scrap dealers.

Patented Shearing Ram Presses combine functions of scrap shear and baling press—do away with preliminary shearing or oxygen cutting.

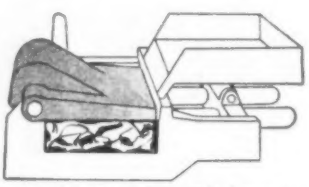
Just tell us the business you're in—and amount and type of scrap you handle. We'll send you literature on Lindemann Presses that meet your needs.

Spare parts available at our Cleveland Service Center

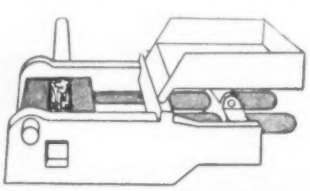
Lindemann "SA" Press handles bales weighing 4 tons or more



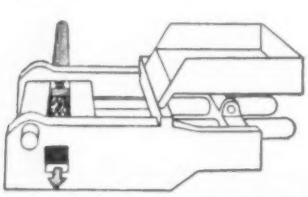
1. Scrap fed into the hopper by crane is tipped into press box by tilting action of hydraulically-controlled hopper.



2. Hydraulically-driven lid closes to exert first stage of scrap compression. Press box accommodates bulky, lengthy scrap – and lid shears off overhanging pieces against serrated edges of press box.



3. Half-pressure ram now effects second stage of compressing scrap into a dense bale. Hopper is being refilled for next baling cycle.



4. Final-pressure ram presses bale into final form and automatically ejects it directly into charging box—or onto slideway landing at furnace platform.

Keep scrap moving *quickly, economically* with Lindemann Baling Presses

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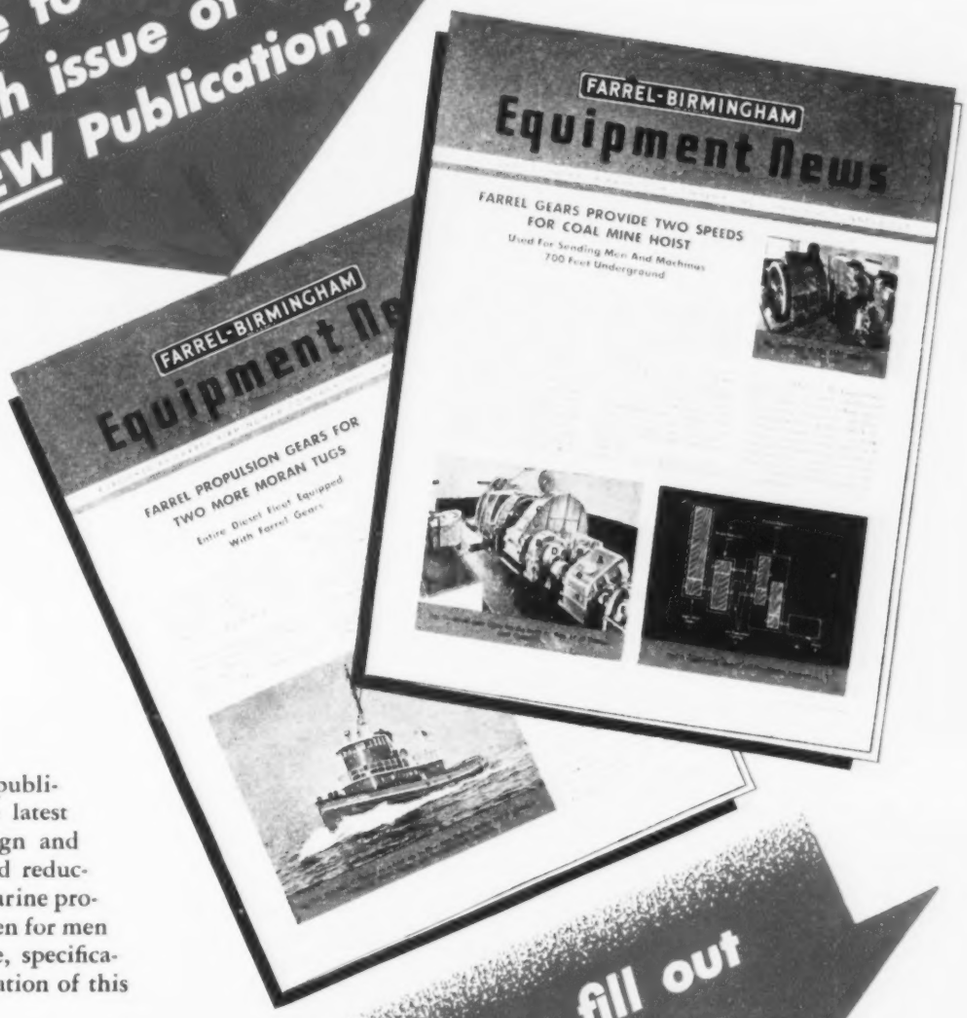
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MACLEOD ABRASIVE BLAST EQUIPMENT

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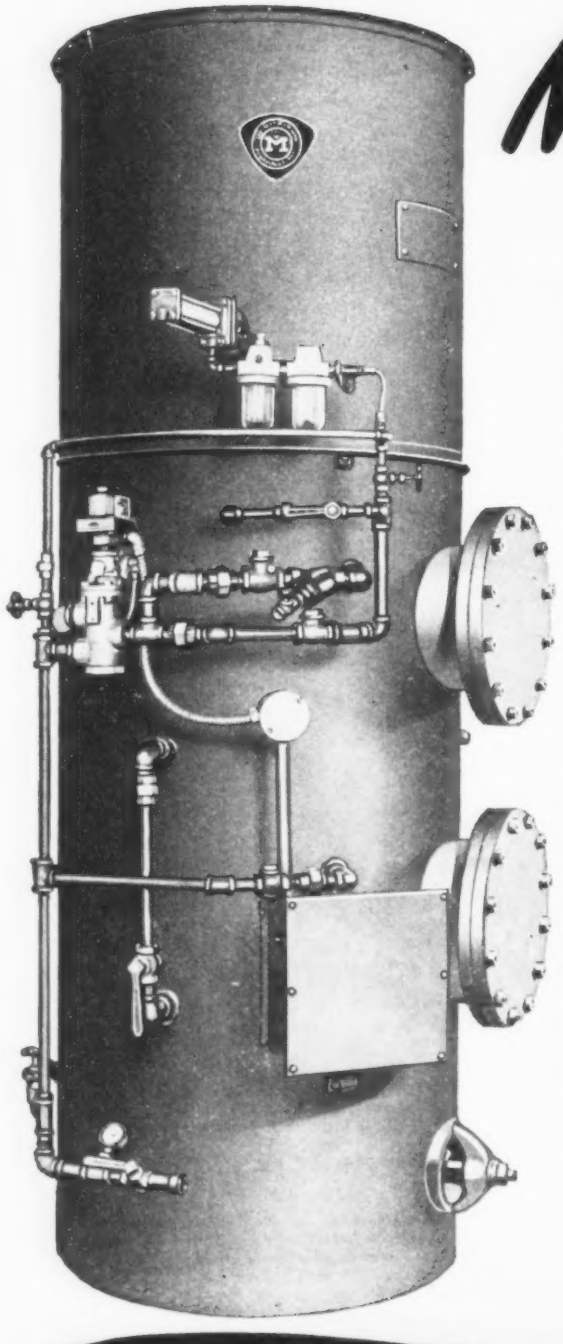


NEW! The Completely Automatic

MACLEOD "AUTO-BLAST" ABRASIVE BLAST CLEANING MACHINE

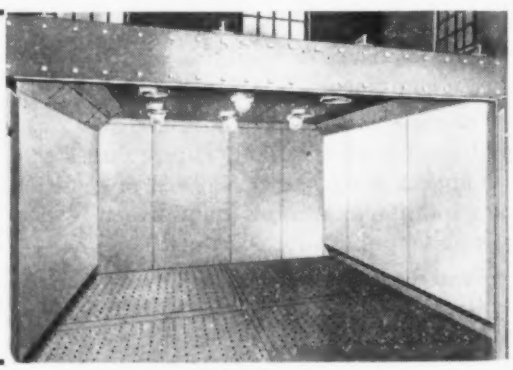
Self-Contained.. Large Capacity.. Can Give 24-Hours-A-Day Continuous Blasting If Required

A completely new Macleod engineering development. A double-chamber blast cleaning machine with a continuous blasting cycle—no shutdown time for reloading . . . greatly reduced labor costs.

The refilling cycle is entirely automatic and does not depend on outside sources—such as a synchronized timing device, or motor-driven pumps or valves. The automatic cycle unit is built into the machine and is not influenced by the type or rate-of-flow of the abrasive. No interchangeable abrasive controls are required and the number and diameter of nozzles is no problem.

The Macleod "Auto-Blast" machine can be used with rooms, tables, barrels, or special automatic devices.

MACLEOD BLAST CLEANING ROOMS



Available in standard sizes or in special sizes to meet individual needs. Equipped with removable air baffles for longer life. Can be furnished with slot for chain-fall hoist or with rails for blast cars. Macleod manual, semi-automatic, and fully automatic blast machines with non-choke type conveyors and latest-design elevators are available for all sizes of rooms.

Write for additional information or send specifications for estimate.

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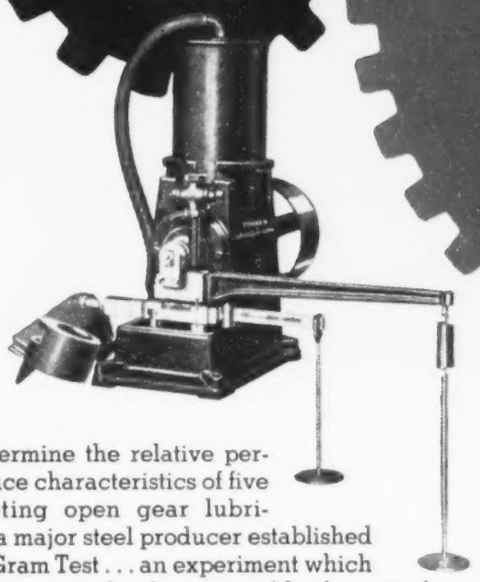
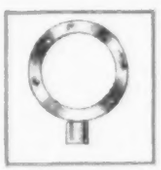
4-GRAM TEST

—PROVES LEADOLENE KLINGFAST BEST FOR LUBRICATING OPEN GEARS



To determine the relative performance characteristics of five competing open gear lubricants, a major steel producer established the 4-Gram Test . . . an experiment which reproduces as closely as possible the actual service conditions encountered in open gear and sleeve bearing lubrication.



In this test the Timken Testing Machine, recognized as standard equipment for testing lubricants, was modified slightly to reproduce more precisely actual service conditions. The hardened and ground steel block and cup, indicated at right, normally is under constant lubrication. However, in the 4-Gram Test the flow of lubrication was cut off and 4 grams of the lubricant being tested were applied at room temperature. The machine then was set in motion and watched closely for signs of scoring.

Five lubricants, all accepted in industry as "good quality," were tested. *Results of the test showed that LEADOLENE KLINGFAST gave over 3½ times the service of the next best lubricant and up to 6 times the service of the other lubricants tested.*

Since open gears are lubricated periodically and not constantly, the pH-ilm must have lasting characteristics. Thus, this test is truly representative of actual field operation tests for open gears. The enduring action together with extremely high pH-ilm strength guarantee the machine actual lubrication and protection.

In testing . . . and more important, in actual service . . . LEADOLENE KLINGFAST regularly gives comparable performances. A product of 76 years of manufacturing experience, it is a lead-based lubricant with an "Indestructible pH-ilm," capable of withstanding pressures up to 50,000 psi. With LEADOLENE KLINGFAST you profit in two ways: from lowered lubrication costs due to less frequent application, and from greater service life from the machinery being lubricated.

Write for technical data or samples for your own testing.

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Results OF 4-GRAM TEST

LEADOLENE KLINGFAST 30 MINUTES without scoring or failing.

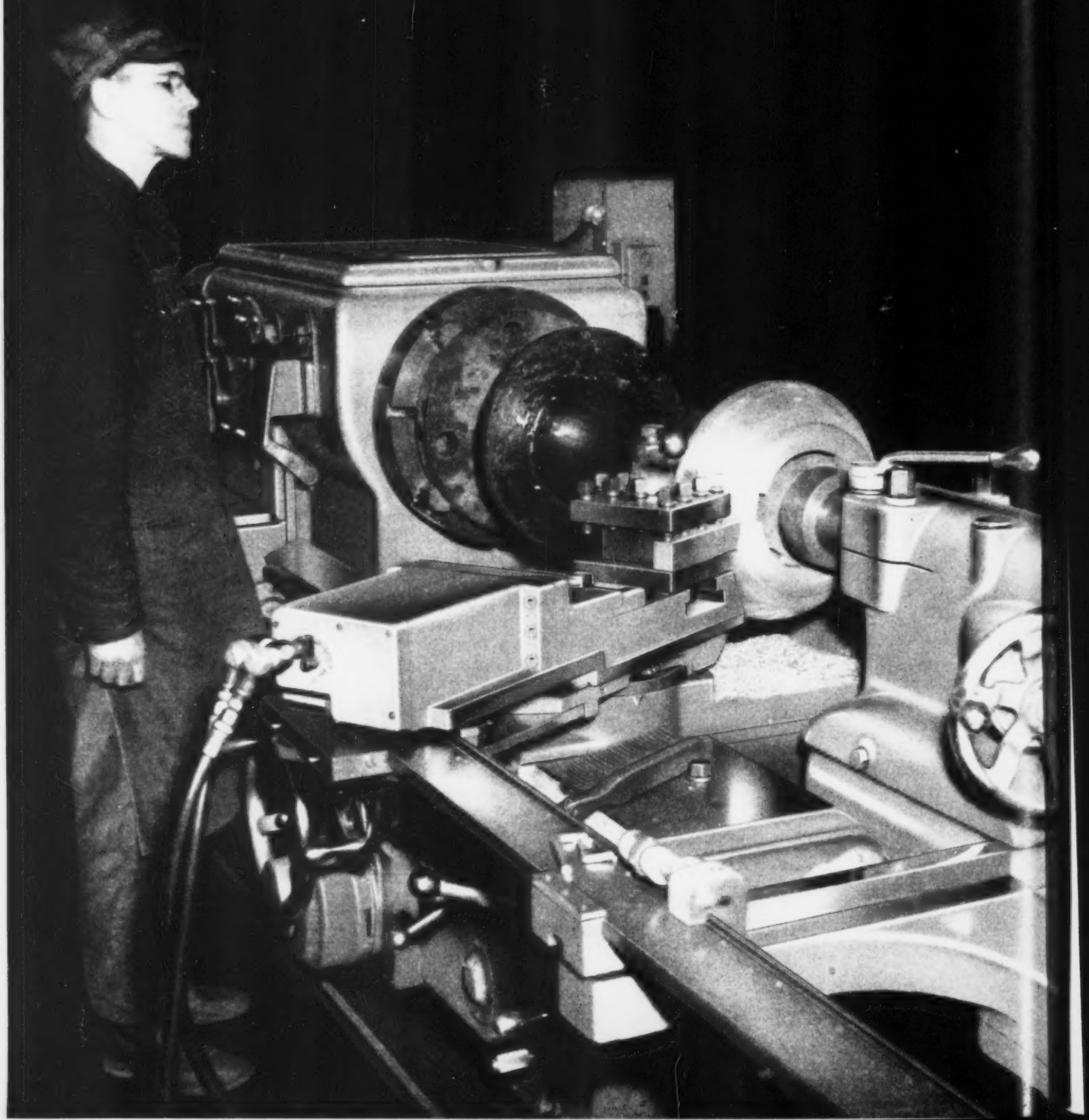
LUBRICANT "A" 5 MINUTES A high grade compound scored at 5 minutes and failed in 12 minutes.

LUBRICANT "B" 8 MINUTES A reputable lubricant of residual nature scored and failed in 8 minutes.

LUBRICANT "C" 6 MINUTES A good lead compounded extreme pressure lubricant scored and failed in 6 minutes.

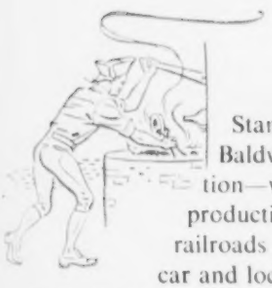
LUBRICANT "D" 6 MINUTES A lead-compounded lubricant scored and failed in 6 minutes.

contouring time cut 58½%



with LeBlond Hydra-Trace

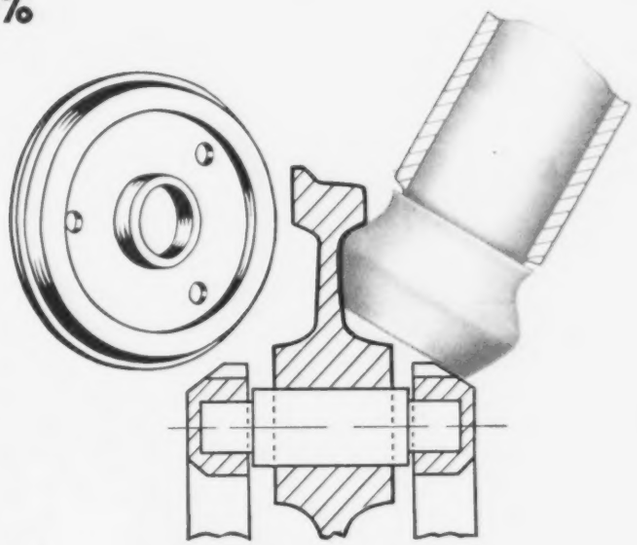
wheel mill roll life boosted 50%



Standard Steel Works Division of Baldwin-Lima-Hamilton Corporation—whose forges first flamed into production in 1795—supplies America's railroads with one-piece, wrought steel car and locomotive wheels. And Standard Steel officials credit LeBlond Hydra-Trace for contributing to their outstanding success in producing these wheels at competitive cost in the quantities needed.

At Standard's Burnham, Pennsylvania Works, rolls of alloy steel are turned to contour and then put to work shaping wheels. The intense pressure and heat of this hot-rolling operation soon work-hardens and wears the rolls out of contour. Formerly a skilled operator—tediously matching contours with a hand-held template—redressed the rolls manually. Four dressings were considered long service for a roll . . . and the work-hardened surface quickly dulled carbide turning tools.

Now, with Hydra-Trace installed on a 25″ LeBlond Heavy Duty Lathe, Standard Steel chalks up big savings under all three headings—man hours, material and tool life. As Marty Gotwalt of Swind Machinery—LeBlond's Philadelphia distributor—puts it, "Hydra-Trace automatically keeps the tool just under the work-hardened skin. We've lopped 14 hours off what used to be a 24 hour job."



And that's not all. Minimum metal-removal by the Hydra-Trace method frequently saves Standard's wheel mill rolls for six dressings—*a bonus of two over the manual method.*

Whether your turning problems—like the wheel mill rolls at Standard Steel—center in the toolroom or demand stepped-up output on the production line, Hydra-Trace is ready to help. For all LeBlond Heavy Duty Lathes built since 1935, this template-controlled, hydraulically powered tracer can be mounted in minutes. Templates are flat, compact, and suitable for both rough and finish turning. Call your LeBlond distributor or write

THE R. K. LEBLOND MACHINE TOOL COMPANY, CINCINNATI 8, OHIO

Ask for Bulletin HT2C for complete details on LeBlond Hydra-Trace.

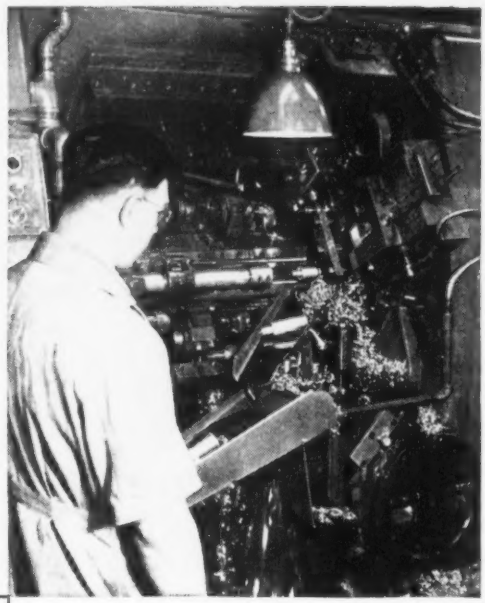
turned faster by LeBLOND *of Cincinnati*

WORLD'S LARGEST BUILDER OF A COMPLETE LINE OF LATHES • *FOR MORE THAN 64 YEARS*

This steel bar

MACHINABILITY

puts parts in the pan...fast!



● Automatics hum a steady tune of *production* when they're running Union Cold Finished Steel Bars. Spindles whirl . . . tools bite into stock . . . and finished parts thump steadily into pans. That's MACHINABILITY—the Union Drawn kind.

Research has made Union Drawn Steel "MACHINABILITY Headquarters." Research that includes many years of actual production-line experience in steel users' plants . . . plus the unequalled facilities of famous Union Drawn machining laboratory.

That's why today's Union Cold Finished Steels consistently produce top ratings on feeds and speeds . . . freedom from abrasive elements . . . long tool life . . . smooth, bright machined surfaces...high production rates...low unit parts costs.

How about your production? Perhaps a session with one of Union Drawn's field technicians could help on set-up, tooling or other phases of machining steel . . . or, on cyaniding, carburizing, carbon correction and other forms of surface treatment. Just contact your Republic District Sales Office, your Union Drawn Distributor, or write:

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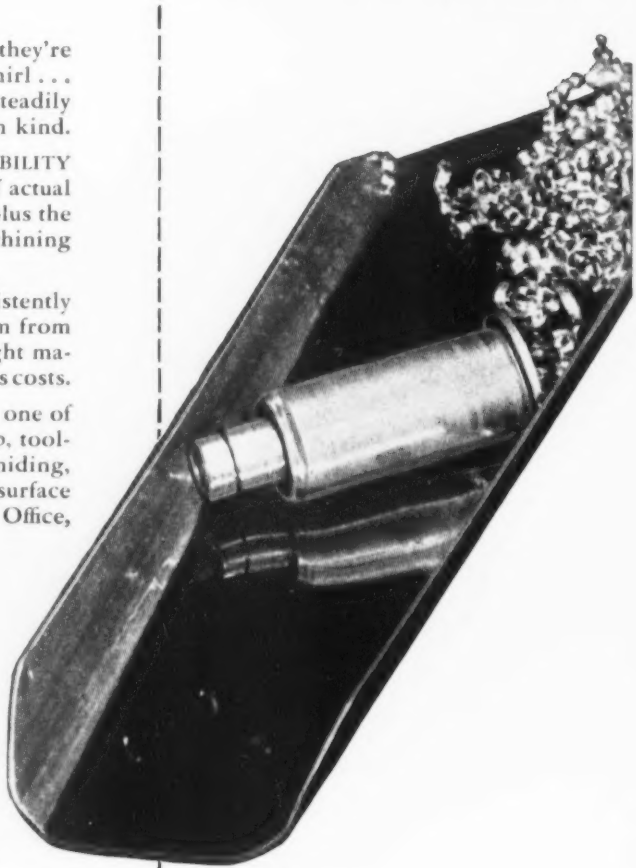

NEED STILL MORE SPEED?

Union Drawn's newest fast-machining grade, B-1113X, could be your solution. Where your equipment and parts design are such that faster speeds and heavier feeds are practical, "X" steel may help boost production still higher. Ask your Union Drawn field man when he calls. Or, write for free booklet 554, "Republic Union Drawn 'X' Steels." It's one of the six handy information-packed booklets in the Union Drawn "Pocket Library."

Republic UNION® COLD DRAWN STEELS

REPUBLIC STEEL

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Let's take a closer look at your MACHINING REQUIREMENTS

Since machining is probably the most widely used method of producing hollow parts from steel tubing, keeping well-informed calls for periodic review of the characteristics of tube machining operations and new developments in this field. A new slant on types of tubing, grades of steel, mechanical properties and dimensional tolerances could show you the way to reduce overall time and costs.

Because B&W's long experience has *proved* the value of never-ending investigation to find *new uses for tubing's adaptability*, B&W keeps reminding people who work with metal that tubing is more than bar stock with a hole in it; it is a semi-finished product.

If there's a machining question on your mind these days, why not drop us a line? Tell us end-use of the mechanical tubing, OD, ID, and length of finished part, method of chucking and sequence of machining operations—description of finished product, dimensional accuracy and type of surface finish required. Send along a print if you like.

The B&W Technical Staff will supply objective recommendations and, if you desire, your regional B&W Tube Representative —Mr. Tubes—will step in to help interpret your needs to the home office. Bulletin TB-324 gives an idea of what can be done with fine tubing. Write for it.

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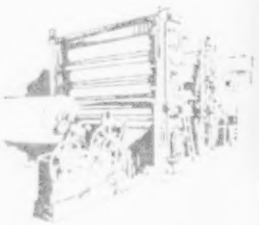
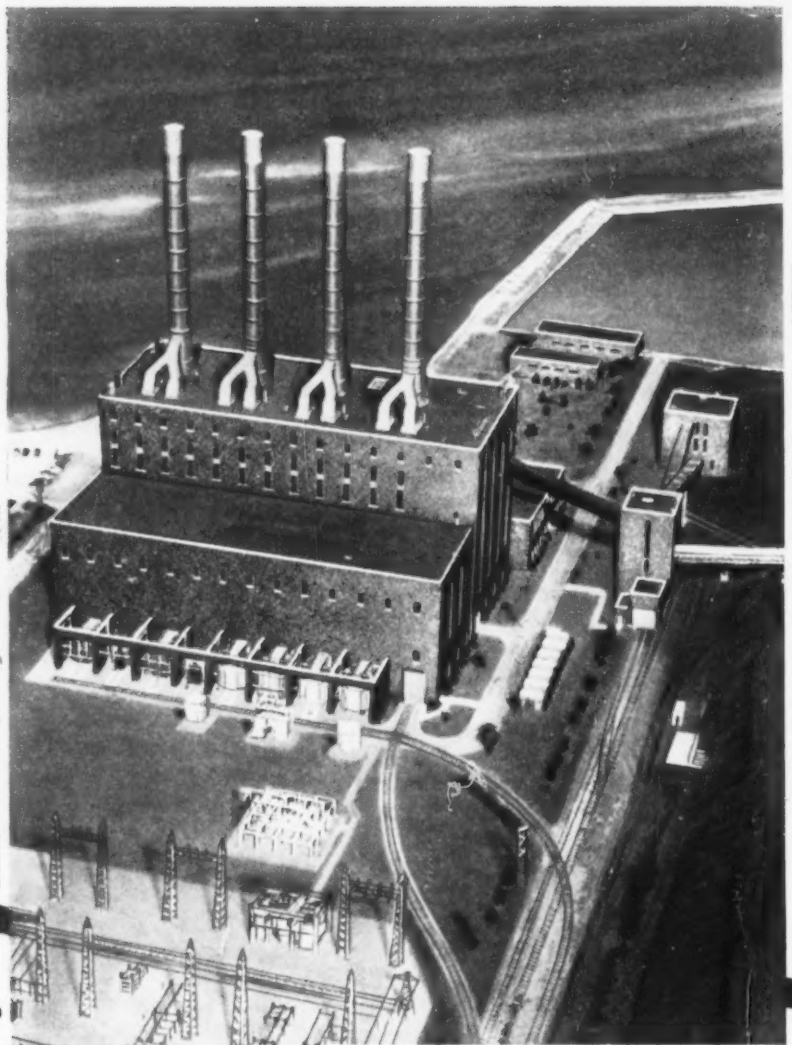
TA-1680M





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as enlarged by the fourth 80,000 kw unit. One of 88 steam and hydro electric plants of Niagara-Mohawk Power Corporation.

PRIVATE ENTERPRISE *In Action...*

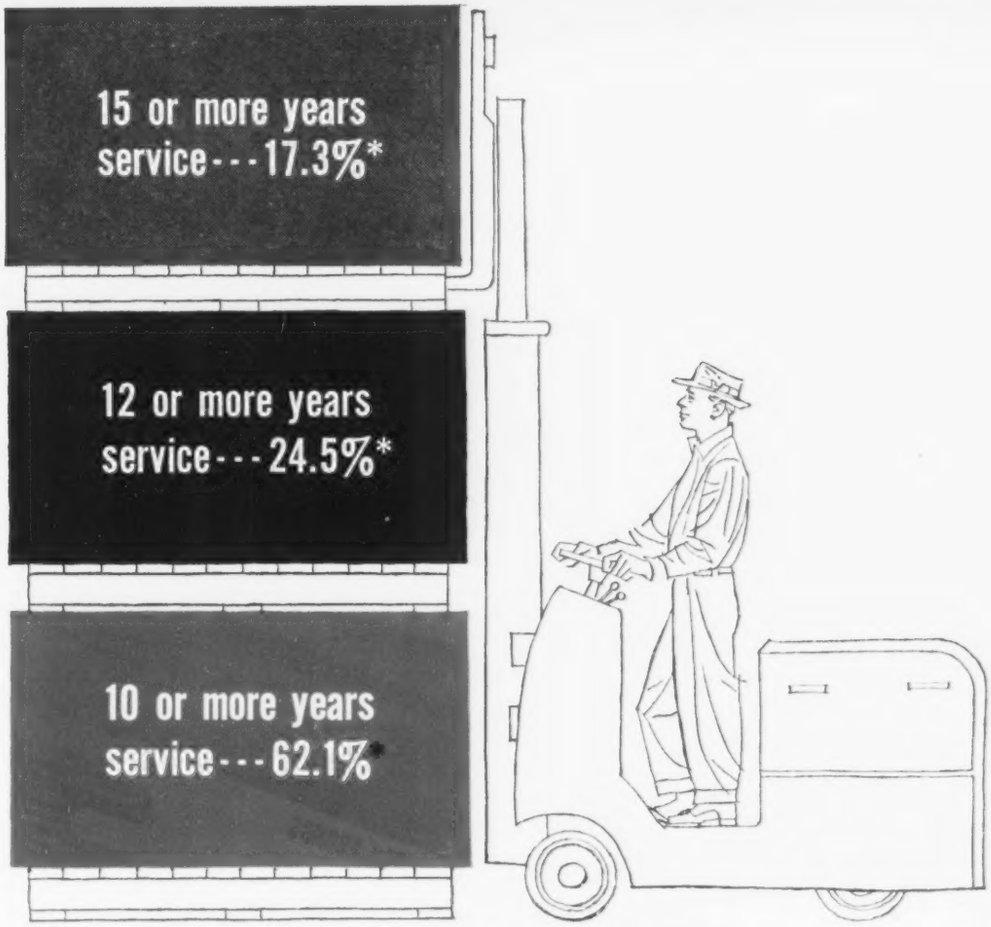
The Niagara-Mohawk Power Corporation has 7000 circuit-miles of transmission lines and 85,000 conductor-miles of distribution lines in upper New York state. Its entire system has a rated capacity of 2,186,451 kw with 600,000 kw now under construction.

A current example of their enterprise is the Oswego Steam station, designed by their engineering department with construction supervision by Stone & Webster Engineering Corporation.

The benefits of competent business management of a privately-owned utility are again demonstrated by the Niagara-Mohawk system.

STONE & WEBSTER ENGINEERING CORPORATION

A SUBSIDIARY *of* STONE & WEBSTER, INC.



— further evidence that **EDISON batteries**

cost less per year of service

Rugged! Dependable! Long-lived!... an EDISON industrial-truck battery is always your best buy. With cells made of steel, inside and out, it's practically indestructible. Electrically, it's practically foolproof . . . overcharging, undercharging, accidental short circuiting, reverse charging, can't hurt it. The big reasons why there's no danger of sudden failures to cause truck downtime.

Which is why an EDISON stays on the job and out of the repair shops . . . helps to make material handling records. In terms of years of service, hours on the job, tons hauled, you can't beat it. Your EDISON field engineer will be glad to tell you more.

YOU CAN ALWAYS RELY ON

EDISON

Nickel • Iron • Alkaline

STORAGE BATTERIES

Edison Storage Battery Division of
Thomas A. Edison Inc., West Orange, N. J.

To get the full economy and dependability built into your Electric Truck— Equip it with an EDISON.

As reported by companies using more than 3,000 industrial truck batteries

WORK ROLLS WITH THE *MAGIC* TOUCH . . .

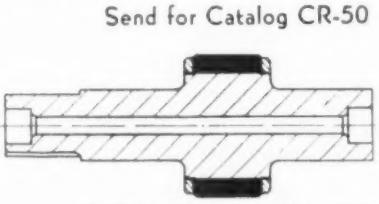
● Here's the magic key to improved surface finish, more uniform gauge and closer tolerance on all types of cold-rolled metal strip. Whether you require an ultra-mirror finish or just a plain, smooth surface—work rolls of Talide (Tungsten Carbide) are the answer. Only Metal Carbides has the know-how and experience to produce carbide rolls from 1 pound laboratory size up to 1,000 pound production mill rolls.

Long-lasting Talide Rolls, made of the world's hardest metal, step up mill production and reduce scrap and rejects. They last 25 to 50 times longer between grinds, and can be reground twice as many times as ordinary rolls. They impart improved physical properties to the strip, reduce plating costs, and eliminate the need for subsequent polishing operations.

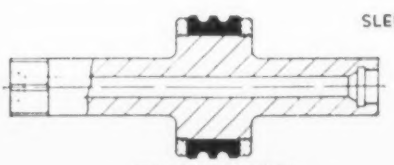
Over 50 mills are now using Talide Rolls for rolling cold-rolled, copper, brass, stainless, spring steel, razor steel, alloys, carbons, aluminum foil, tinsel ribbon, flat and shape wire.

Talide Rolls are designed to help the metalworking industry produce more efficiently—in less time—at lower cost.

Send for Catalog CR-50



SLEEVED ROLLS FOR FLAT WIRE



FOR SHAPE WIRE

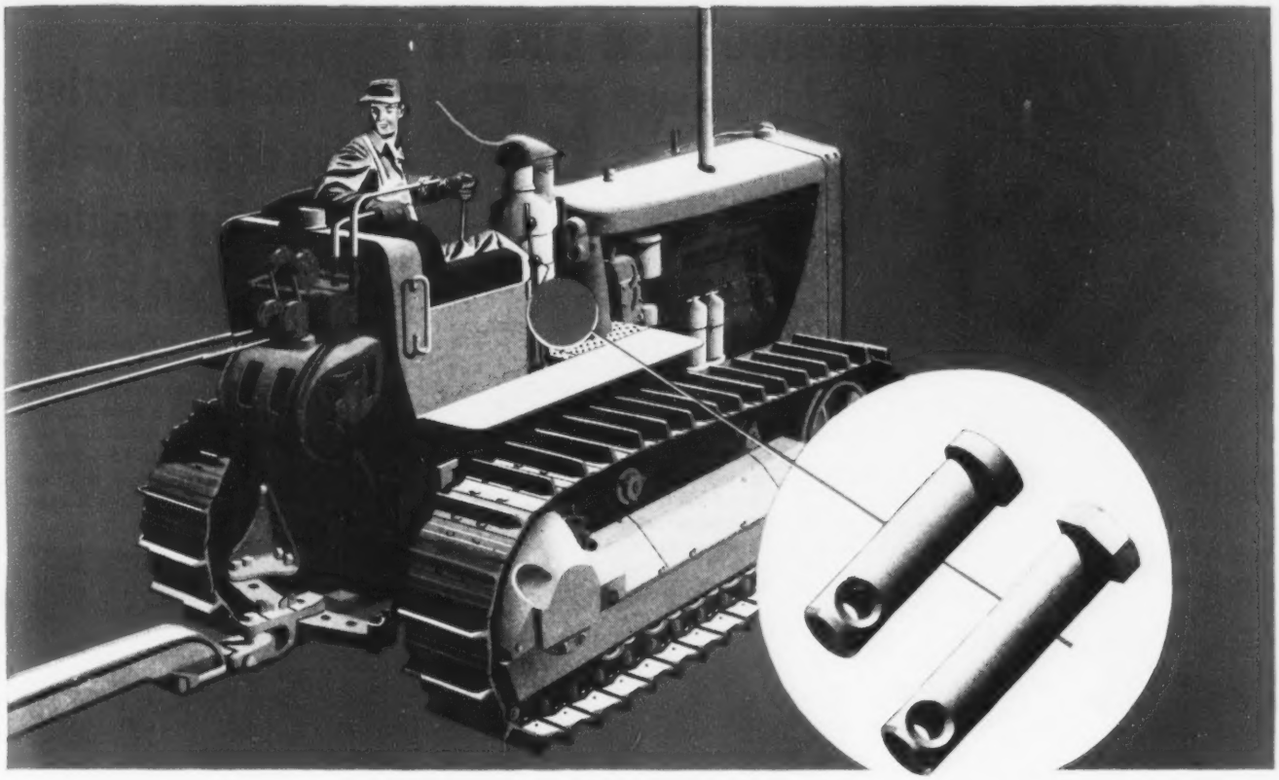
METAL CARBIDES CORPORATION
TALIDE
YOUNGSTOWN, OHIO

METAL CARBIDES CORPORATION

YOUNGSTOWN 7, OHIO

SINTERED CARBIDES • HOT PRESSED CARBIDES
CUTTING TOOLS • DRAWING DIES • WEAR RESISTANT PARTS

OVER 25 YEARS EXPERIENCE IN TUNGSTEN CARBIDE METALLURGY



parts shown actual size

How *Caterpillar* Gets Two Townsend Fasteners at the Former Price of One

"Caterpillar" built products have a long-established reputation for rugged quality and stamina, plus economy of operation that makes them a favorite in any land where the going is tough. They maintain this enviable record by close attention to every detail of part design and assembly. Even the small clutch facing release pins used in the Caterpillar Track Type Tractor above came under scrutiny recently.

Formerly, "Caterpillar" made these pins in their own plant, but after consulting with Townsend engineers and making some slight design changes they found that Townsend could cold-head these pins at a considerable saving. Assembly costs were also materially reduced resulting in substantial annual savings running into five figures! Actually "Caterpillar" gets two pins for the price of one—at the same time, "Caterpillar's" demand for top quality is maintained and design simplified.

Again and again in many industries Townsend demonstrates that it is "The Fastening Authority" by effecting substantial savings in material and assembly costs—improving customers' products. With the accumulated knowledge of more than a century of cold-heading experience to call upon, Townsend engineers can help reduce your fastening costs—improve the performance of your product. To quickly learn how this is done, send drawings or samples of the items you want to your nearest Townsend plant or sales office. You will receive an estimate without obligation.

Townsend

COMPANY • ESTABLISHED 1816

NEW BRIGHTON, PENNSYLVANIA

Sales Offices in Principal Cities

Cherry Rivet Division • Santa Ana, California

THE FASTENING AUTHORITY—Experience: *over 136 years*—**Capacity:** *sixty-million parts daily*—**Products:** *over ten-thousand types of solid rivets—cold-headed parts—Cherry Blind Rivets—Twinfast Screws—self-tapping screws—tubular rivets—locknuts—special nails—formed wire parts.* **Plants:** *New Brighton, Pennsylvania—Chicago, Illinois—Plymouth, Michigan—Santa Ana, California.*

New - NOTHING ELSE LIKE IT

FLEX-TESTER

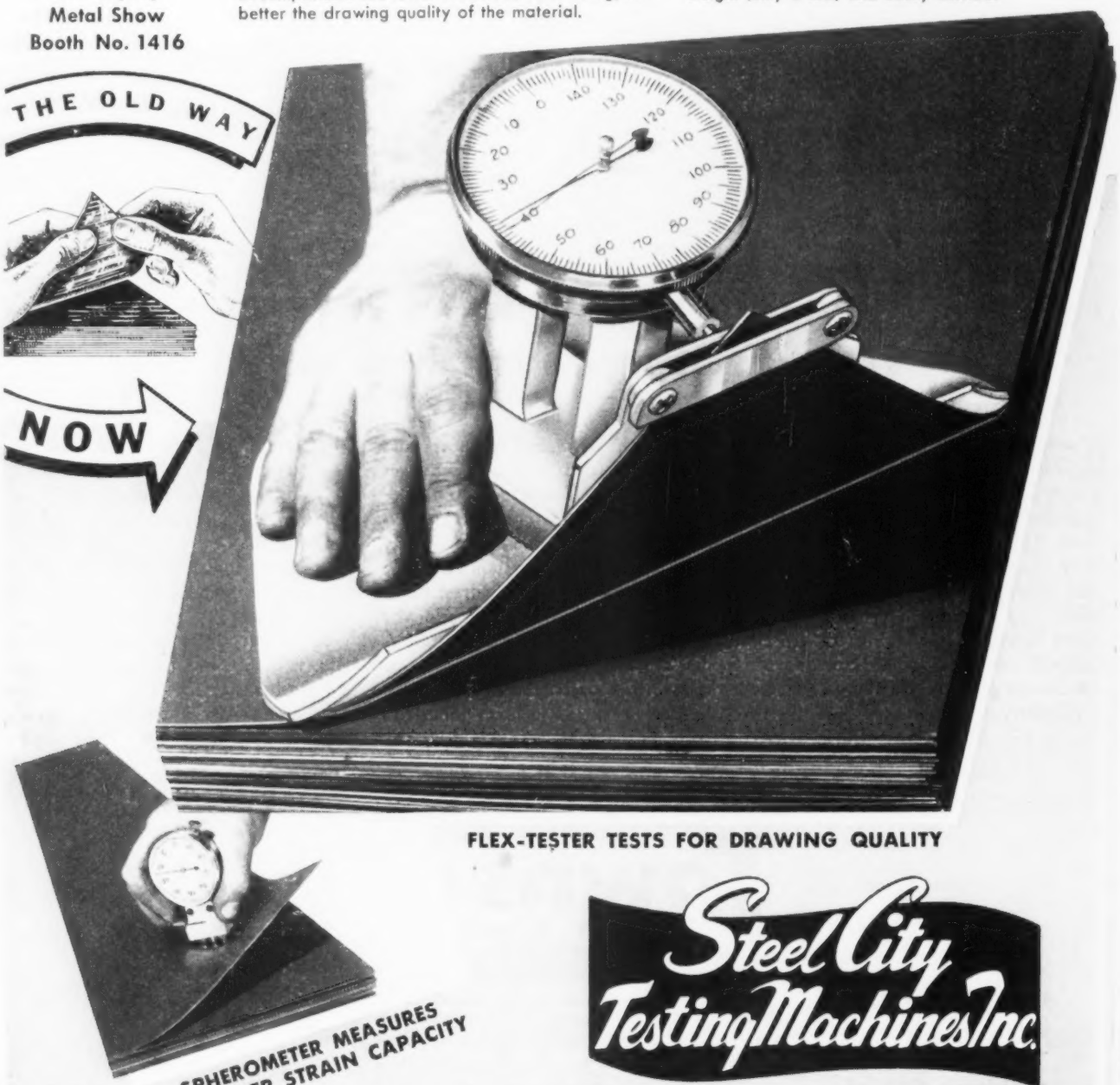
Developed by Jones and Laughlin Steel Corporation and manufactured and sold exclusively by Steel City Testing Machines, Inc.

For non-destructive testing of sheet metal for drawing qualities and stretcher strain

This important contribution to sheet metal testing is simple, compact and does its job quickly. The **Flex-Tester** bends a corner of a sheet through a standard arc measuring on a dial indicator the resistance of the metal to the bending operation. A **"Dial Converter"** furnished with the tester enables the operator to convert readings obtained on various thicknesses of material to a standard for the purposes of comparison. The lower the corrected reading, the better the drawing quality of the material.

A **spherometer** is also supplied. It measures the curvature of the permanent set of the metal and thereby gives an indication of the stretcher strain characteristics. The **Flex-Tester** is a must for steel mills, stamping plants, warehouses. Write us if you wish detailed information on the **Flex-Tester** or if you wish us to have a representative call and demonstrate this testing machine to you. It is lightweight (only 6 lbs.) and easily carried.

On Display
Metal Show
Booth No. 1416



FLEX-TESTER TESTS FOR DRAWING QUALITY

Steel City Testing Machines Inc.

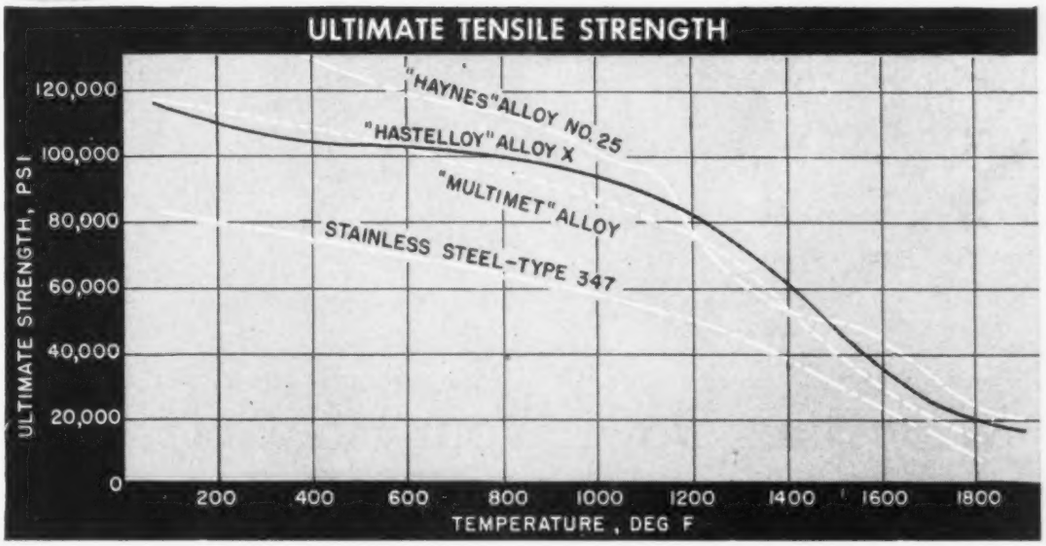
8843 LIVERNOIS • DETROIT 4, MICHIGAN

A New

HASTELLOY
Trade-Mark
Alloy X

"HAYNES" HIGH-TEMPERATURE ALLOY

High Strength at Elevated Temperatures
Excellent Oxidation Resistance
Low Strategic Alloy Content
Excellent Formability
Good Casting Characteristics



The excellent high-temperature properties of HASTELLOY alloy X—a new material that contains iron, nickel, chromium, and molybdenum—make this alloy a good choice for aircraft sheet-metal parts, such as cabin heaters, tail cones, and collector rings. It is also being tested for aircraft nozzle vanes, both precision-investment-cast and fabricated from sheet. In addition, it is designed for high-temperature applications in the chemical, petroleum, metal-producing, and heat-treating industries.

HASTELLOY alloy X has a relatively low content of strategic metals. Tests made so far indicate that alloy X has high-temperature properties comparable to those of other alloys containing a higher percentage of strategic metals (see graph).

The new alloy is available as sheet, plate, bars, wire, and precision-investment castings. For additional properties data, write to our General Offices in Kokomo, Indiana, for a copy of the new booklet "HASTELLOY Alloy X."

HAYNES alloys
TRADE-MARK

"Haynes," "Hastelloy," and "Multimet" are trade-marks of Union Carbide and Carbon Corporation.

Haynes Stellite Company
A Division of
Union Carbide and Carbon Corporation
UCC
General Offices and Works, Kokomo, Indiana
Sales Offices
Chicago — Cleveland — Detroit — Houston
Los Angeles — New York — San Francisco — Tulsa

Why Burn Down Your House for Roast Pig?

IN ancient China, men ate meat raw. But one day, while Ho-ti the swineherd gathered mast for his hogs, his stupid son Bo-bo, playing with fire, burned down their straw hut. Bo-bo sniffed the odor of burnt pig. He touched one to see if it was still alive, scorched his fingers, put them in his mouth and was amazed at the delicious taste. Father came home and caught his son devouring a pig. Ho-ti tried one, too, found it intoxicatingly sweet and satisfying.

Thereafter, neighbors observed feverish building of new straw huts at Ho-ti's, followed always by conflagrations. The secret leaked and fires became widespread. In a few weeks even his Lordship's town house was on fire. Finally, straw for hut building disappeared from the market and young pigs could not be had for love or money. At last, after many generations, a wise man arose who said that a pig could be roasted without burning down an entire house.

Thousands of years later, we Americans feast deliriously on "roast pig." Accompanying our delights are fires of inflation, which can destroy our values just as certainly as the roasting of Ho-ti's pigs consumed his earthly possessions. But surely we need not await the coming of a sage to tell us not to burn down our houses to enjoy the delights of roast pig!

Let us unite to stop the ruinous flames of inflation. Curb wasteful and unnecessary government spending. Balance our Federal budget. Control our national debt and reduce taxes. Only in this sane way can we produce more straw and enjoy our houses, raise more pigs and eat them, too.

QUALITY V YOUNGSTOWN SERVICE

The Youngstown Sheet and Tube Company

General Offices--Youngstown 1, Ohio

Export Offices--500 Fifth Avenue, New York

MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

RAILROAD TRACK SPIKES - CONDUIT - HOT AND COLD FINISHED CARBON AND ALLOY BARS - PIPE AND TUBULAR PRODUCTS - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RODS - SHEETS - PLATES

FLAT SPRING STEEL

You can get it now! . . . and we believe it's the best spring steel we've ever made

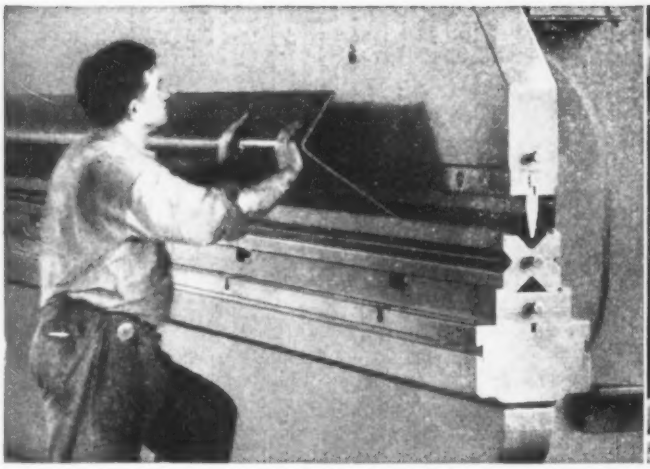
OUR NEW specialty spring steel plant is in full swing. Equipped with today's most modern, precision machines, we believe we're producing flat spring steel that gives more for your money than ever before.

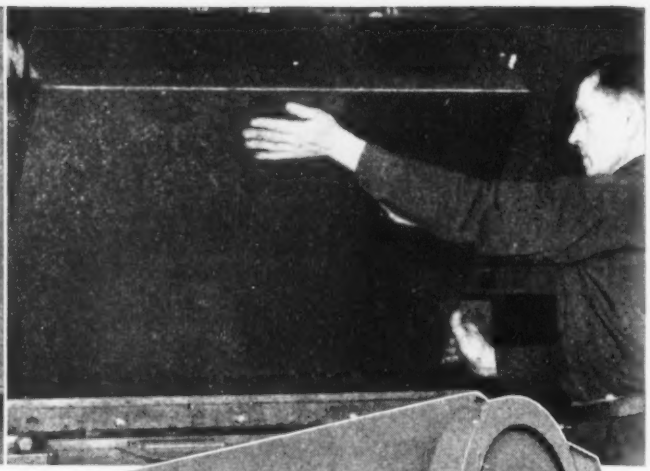
This new spring steel is tops in uniformity. It **saves you preparation time . . . cuts down machine** stoppages . . . gives you the greatest number of perfect parts from every foot and pound of steel.

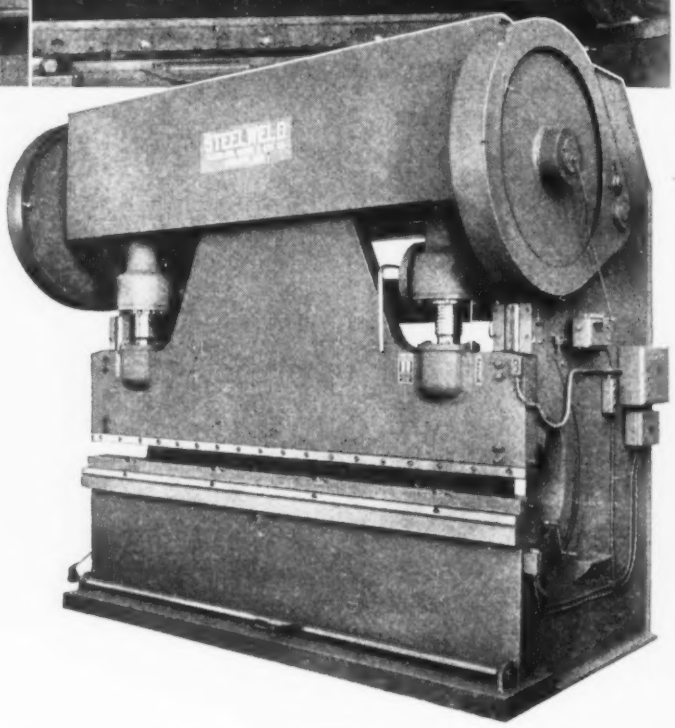
With our greatly increased capacity we can make prompt deliveries on flat spring steel. And if you need high carbon round or shaped wire, ask what we can do. John A. Roebling's Sons Company, Trenton 2, N. J.

ROEBLING

ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13225 LAKEWOOD HEIGHTS BLVD. • DENVER, 4801 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.







BEND LIGHT OR HEAVY PLATES QUICKLY WITH STEELWELD PRESSES

Above Left:
Bending a 10′ x 5/8″ steel plate.

Above Right:
Forming a drawer of 16 gauge steel. Corners produced are straight, sharp and accurate.

You can shift from braking operations on 20 gauge plate to ½ inch or 1 inch plate all in the matter of a few minutes with Steelweld presses. Size of plate makes no difference as long as you keep within the tonnage rating of the machines.

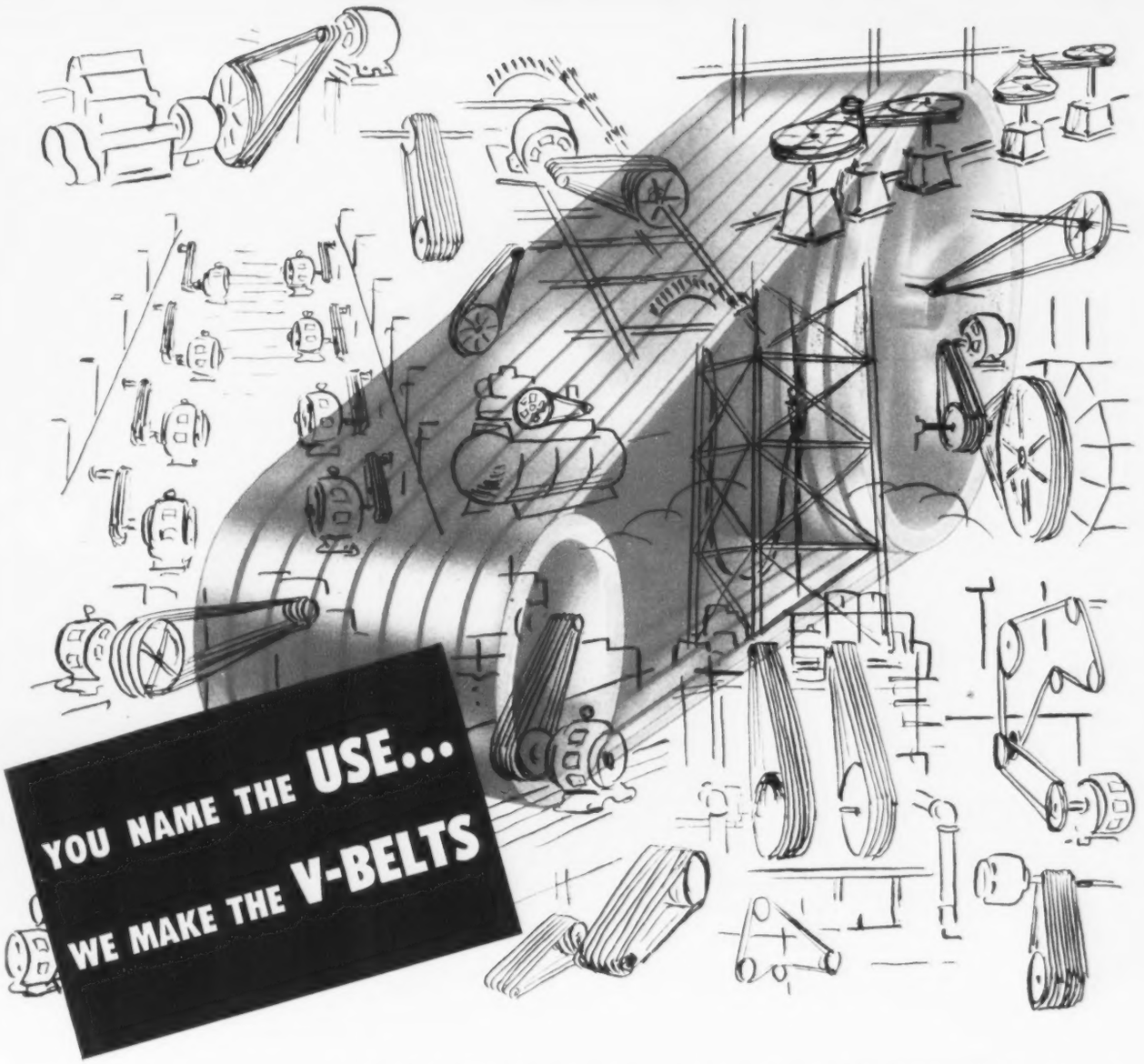
If yours is a jobbing shop or plant where only a small number of any part is produced, you will find the versatility of Steelwelds advantageous. Equally satisfactory are these presses for mass-production runs of thousands of similar pieces.

Hundreds of Steelwelds are speeding production and cutting costs in plants in the United States and many foreign countries.

GET THIS BOOK!
CATALOG No. 2010 gives construction and engineering details. Profusely illustrated.

THE CLEVELAND CRANE & ENGINEERING CO.
4826 EAST 281st STREET • WICKLIFFE, OHIO

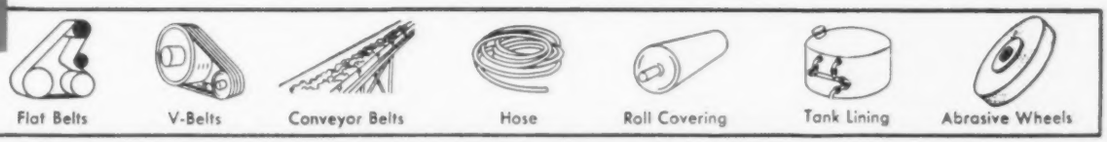
STEELWELD
BENDING PRESSES
BRAKING • FORMING • BLANKING • DRAWING • CORRUGATING • PUNCHING



Condor V-Belts can save you money on any type of Multiple Belt drive . . . for any use . . . in any industry. They are the smoothest running V-belts made because every part of the construction is *precision-balanced*. Straight sidewalls provide more grip, less slip, longer life. They are made also in special oil, heat, and static-resisting constructions • V-Belts may not be your problem today but whenever you think of hose, of conveyor, transmission, V-belts, or industrial rubber products for *any* use — remember "Raybestos-Manhattan makes it". Consult your R/M representative.

MANHATTAN RUBBER DIVISION — PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.



Other R/M products include: Industrial Rubber • Fan Belts • Radiator Hose • Packings • Brake Linings • Brake Blocks Clutch Facings • Asbestos Textiles • Sintered Metal Parts • Bowling Balls

NEW from SKF

the HESS-BRIGHT "SY" UNIT PILLOW BLOCK

A new Unit Pillow Block, designed by SKF to meet tomorrow's needs of modern industry.

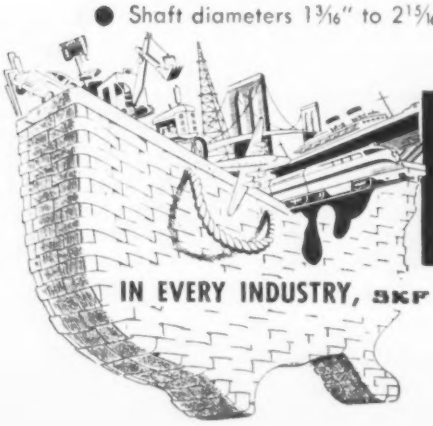
Here are the design features:

- SKF Red Seal, made of DuPont Fairprene, retains lubricant. Wiping action of the seal against the inner ring is practically frictionless.
- Rotating flingers exclude dirt.
- Set screws for ease of installation.
- Spherical outer ring compensates for initial misalignment.
- Alemite fitting for re-lubrication.
- Interchangeability with existing installations made possible by bolt hole spacing and center height features.
- Shaft diameters 1 3/16" to 2 15/16".

Detailed illustration of rotating flinger and RED SEAL—the extremely light tension contact seal.

From now on, the name to remember in Unit Pillow Blocks is HESS-BRIGHT "SY"—manufactured in our plants, to the same high quality standards as all SKF products. Ask your SKF Distributor to show you the HESS-BRIGHT "SY"; or write SKF direct for complete information on this *newest* Unit Pillow Block.

SKF INDUSTRIES, INC., Phila. 32, Pa.—*manufacturers of* **SKF** *and* HESS-BRIGHT *bearings.* 7322-A



SKF®
BALL AND ROLLER BEARINGS

IN EVERY INDUSTRY, SKF Puts The Right Bearing In The Right Place

Picture above of the wreck in which the tractor was demolished, while the tank Trailmobile of high-strength Otiscoloy held its cargo intact; (below) the same trailer, thirty days later, after being rebuilt.

J&L OTISCOLOY HIGH STRENGTH STEEL *plus* TRAILMOBILE CONSTRUCTION

Saved the day for this cargo of gasoline

When forced off a Missouri highway, this gasoline tank Trailmobile went over a high embankment, turned over twice and landed upside down—*but did not lose a gallon of its highly-inflammable cargo.* The tractor pulling the Trailmobile was completely demolished.

Trailmobile Inc., renowned for superior trailers, made a smart move when they selected high-strength J&L Otiscoloy Steel for Trailmobile construction. J&L Otiscoloy (with twice the yield strength of mild steel) will stand up better and longer under the severe impact and fatigue conditions of modern trailer operation.

In addition, J&L Otiscoloy's great strength permits Trailmobile to employ lighter weight sections in the construction—thereby cutting deadweight—and permitting Trailmobile trailers to haul larger payloads within the legal weight limits.

Finally, equipment builders such as Trailmobile have found that the ease of welding Otiscoloy lends itself to their production techniques and helps assure a strong, sound, finished product (as demonstrated in the photo above).

Why don't you check into the possibility of using J&L Otiscoloy to advantage in your operation? Send for a free copy of our booklet: "J&L Otiscoloy—The Transportation Steel." Or get in touch with the J&L representative nearest you.

JONES & LAUGHLIN STEEL CORPORATION
PITTSBURGH 30, PA.

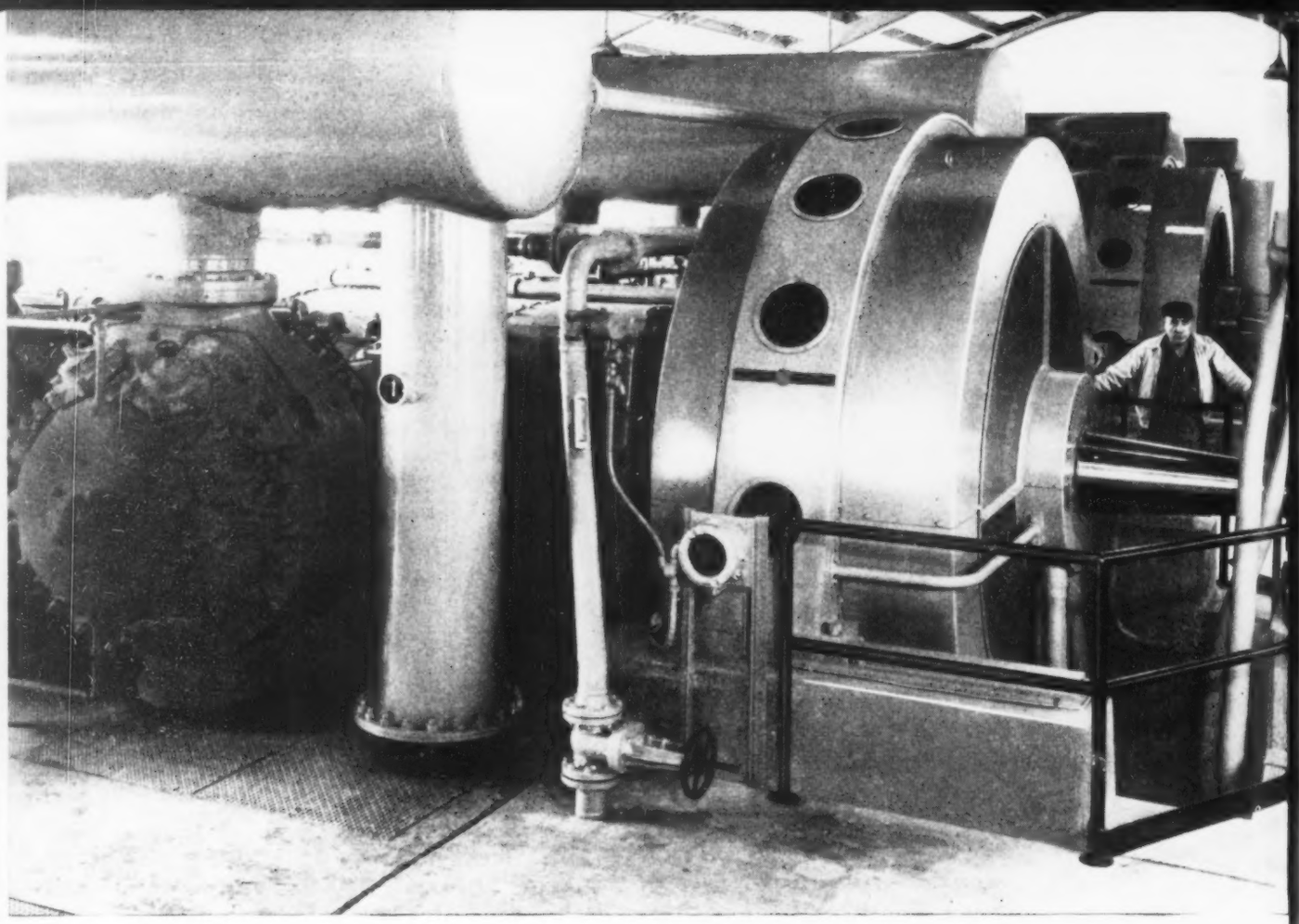
J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION
403 Liberty Avenue • Gateway Center, Pittsburgh 30, Pa.
Please send me a copy of your booklet—"J&L Otiscoloy—The Transportation Steel."

Name_____

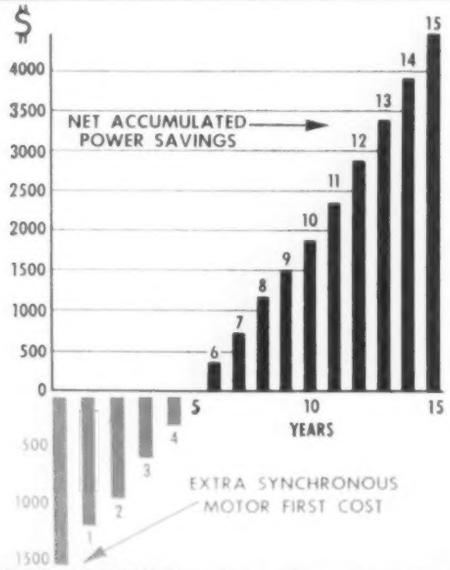
Company_____

Address_____



COMPRESSORS IN A GAS STORAGE STATION are driven by General Electric 3000 hp, 300 rpm synchronous motors.

Can synchronous motors cut

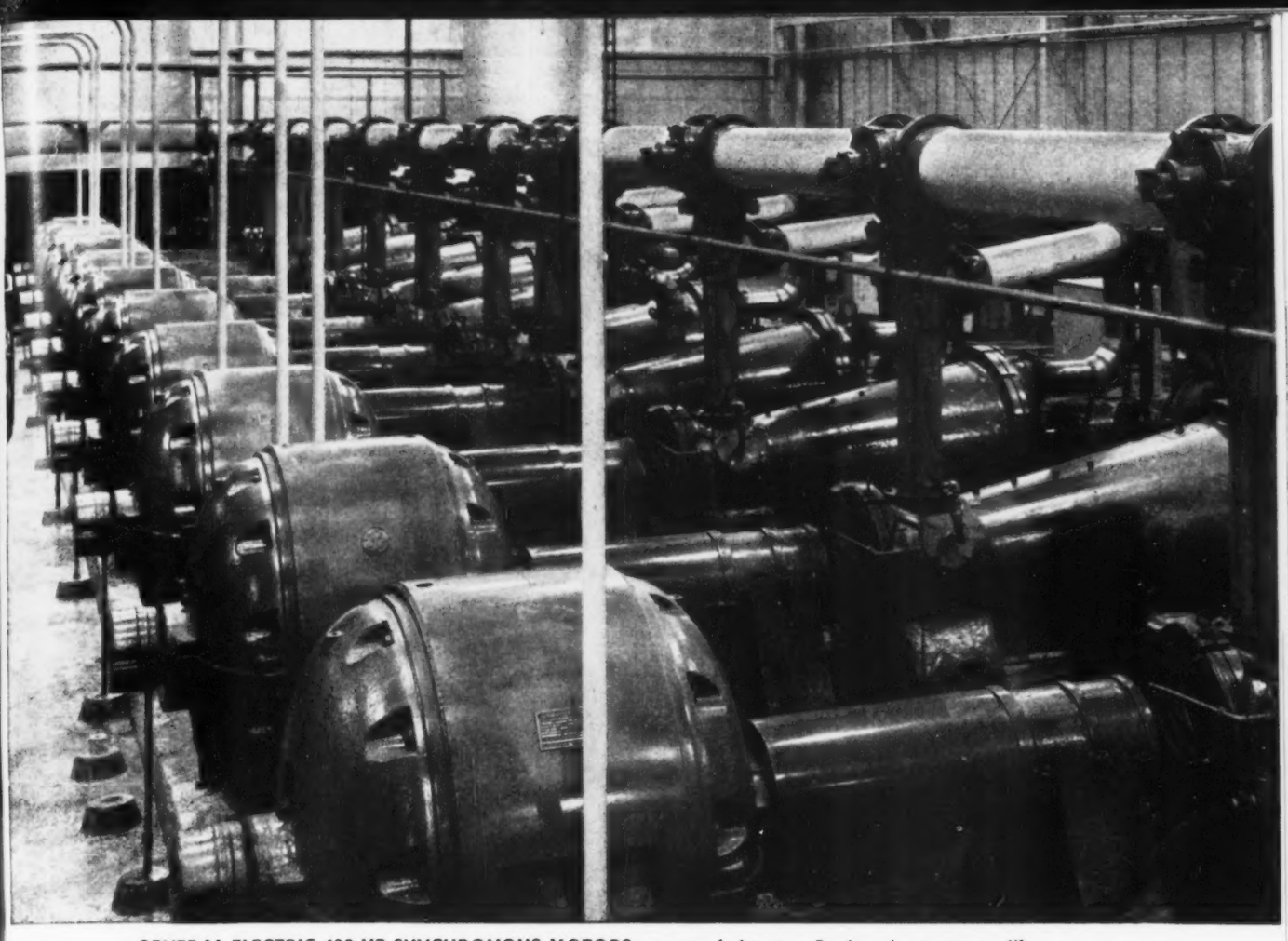


OPERATING SAVINGS on the synchronous motor application described above are shown over a period of twenty years. Extra first cost will be amortized in five years; savings will continue for many more.

Here's how one plant saves with a G-E Synchronous Motor

The specifications for a new pump motor were 250 hp, 600 rpm, 2300 volts, 3 phase, 60 cycle. The price of a 1.0 Power Factor synchronous motor, including exciter and control, was higher than an equivalent squirrel-cage induction motor with control. However, the synchronous motor efficiency, including exciter loss, was 1.6% higher than the induction motor (93.0% vs 91.4%). Since the motor was to operate continuously at a power cost of 11 mils per kilowatt-hour, it was found that the power savings would repay the additional investment in only five years. The operating savings will continue throughout the life of the motor—10, 20, even 30 years.

Savings such as these make synchronous motors the most economical drive for many heavy-duty, continuous-service applications. And in many cases, synchronous motors are lowest in first cost, too.



GENERAL ELECTRIC 400 HP SYNCHRONOUS MOTORS are coupled to ten Jordans in a paper mill.

ut your plant's operating costs?

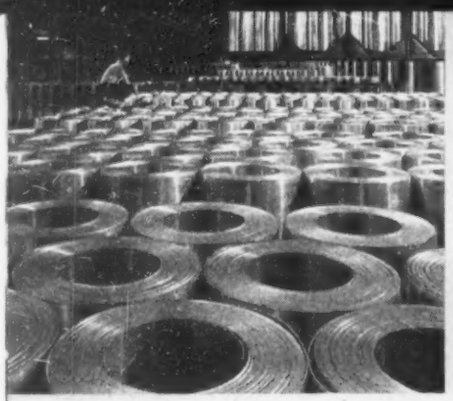
Greater Efficiency on Large, Constant-Speed Applications Can Lower Power Costs Substantially

On certain applications selection of General Electric synchronous motors can bring about substantial savings in plant operating costs. Synchronous motors usually have a higher full-load efficiency than any other type of motor, produce more work per dollar's worth of power consumed.

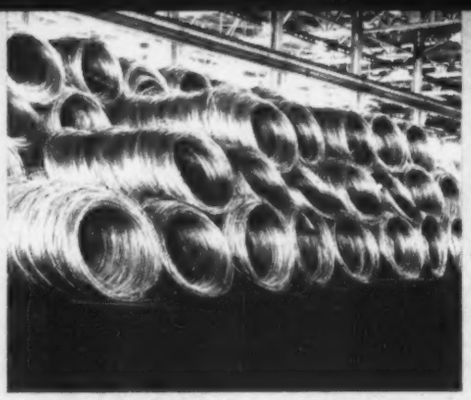
Furthermore, synchronous motors may be able to improve plant power factor—the ratio of total kilowatt load to total kva load. When these two fall out of balance, high system losses, high power bills, or increased maintenance costs commonly result. Using a *unity power factor* synchronous motor adds only to total kw load. And, a *leading power factor* synchronous motor will actually supply reactive kva's to your system, while operating at its normal rated output.

Before you select a drive for a large piece of equipment providing heavy and continuous service, be sure to investigate the economics of General Electric synchronous motors. Call in your G-E representative—he'll be glad to discuss your situation with you. Also, information on G-E synchronous motors and their application is available in the following bulletins: GEA-5332, "Low-Speed Synchronous Motors;" GEA-5426, "High-Speed Synchronous Motors;" GEA-5817, "Plant Power Factor Improved With G-E Synchronous Motors." Write to Section 770-27, General Electric Company, Schenectady 5, N. Y.

GENERAL ELECTRIC

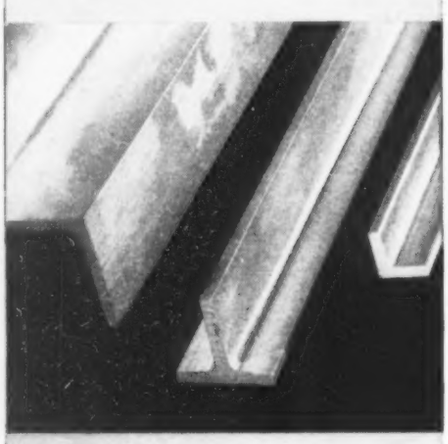


SHEET AND PLATE: Flat and coiled sheet; circles; patterned sheet; plate; tread plate; roofing and siding sheet; roofing accessories and fasteners; specialty sheet.



WIRE: Coiled and straight lengths; rivet wire; flattened and slit wire.

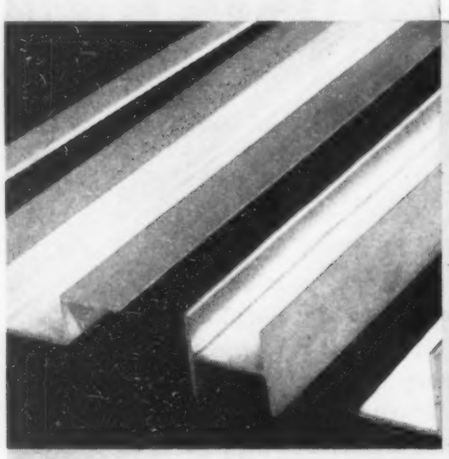
SCREW MACHINE STOCK: All free-cutting alloys plus the higher strength alloys—24S, 61S and 75S.



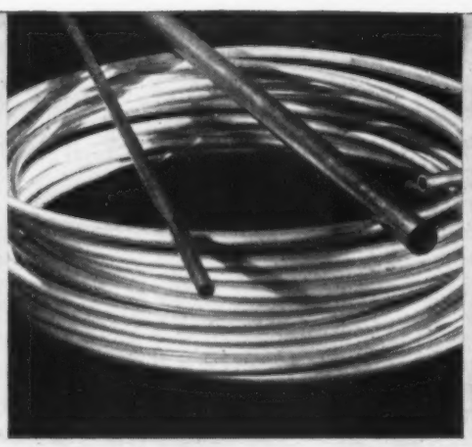
ROLLED SHAPES: Equal angles; unequal angles; channels; I-beams; H-beams; Tees; Zees.

These are the

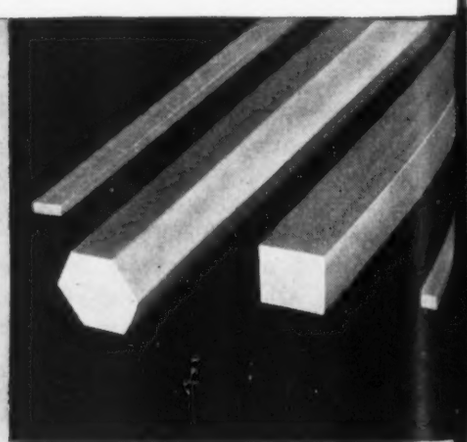
MILL PRODUCTS *of* ALCOA



EXTRUDED SHAPES: Miscellaneous extruded shapes such as angles, channels, half rounds, quarter rounds, thresholds, truck corners, structural members, etc. Round, square, and rectangular bars.



TUBE AND PIPE: Coiled tube; straight tube in round, square and rectangular shapes; heat exchanger tubes; standard pipe and pipe fittings; irrigation pipe; rigid conduit.



BAR STOCK: Square, hexagonal and rectangular bar stock in free-cutting and higher strength alloys.

"SEE IT NOW" with Edward R. Murrow — CBS-TV every Sunday . . . brings the world to your armchair. Consult your newspaper for local time and channel.

ALUMINUM COMPANY OF AMERICA

They have these 12 basic advantages and scores of others

• Lightweight • High Resistance to Corrosion • High Electrical Conductivity • High Conductivity for Heat • High Reflectivity for Light and Radiant Heat • Workability • Nontoxic • Strength in Alloys • Nonsparking • Nonmagnetic • Appearance • High Scrap and Re-Use Value

With them goes the skill of 64 years' experience in fabricating, assembling and finishing aluminum

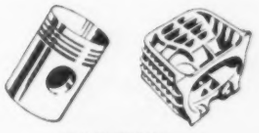
The world's greatest aluminum research and testing facilities are available to help you determine the suitability of aluminum for your products. And to train your personnel, Alcoa offers technical literature and how-to-do-it movies.

They are available from your local ALCOA sales office, distributor or jobber

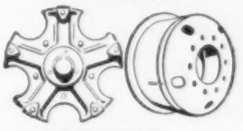
For all possible co-operation in filling your orders, call your local Alcoa sales office, distributor or jobber. You'll find them listed under "Aluminum" in your classified phone book.

ALUMINUM COMPANY OF AMERICA
1807L Gulf Building • Pittsburgh 19, Pa.

ALCOA ALSO MAKES PRODUCTS TO CUSTOMER SPECIFICATION



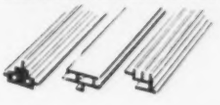
CASTINGS . . .
sand, plaster, permanent mold and die.



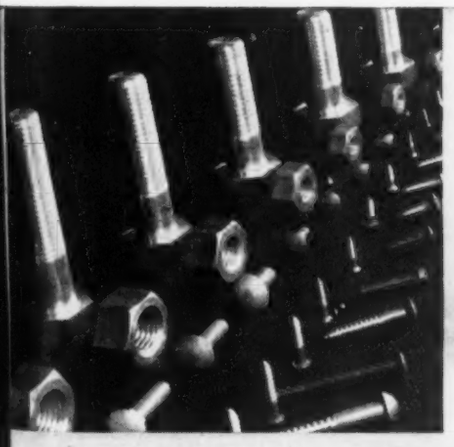
FORGINGS . . .
drop, hammer and press forgings.

SCREW MACHINE SPECIALTIES . . .
special fasteners and screw machine parts.

IMPACT EXTRUSIONS



EXTRUDED SHAPES



FASTENERS: Machine screws, wood screws, washers, nuts, bolts, rivets.

WELDING AND SOLDERING SUPPLIES: Welding and brazing wire, welding and brazing flux, solder flux, solder.

ALCOA *first in* ALUMINUM

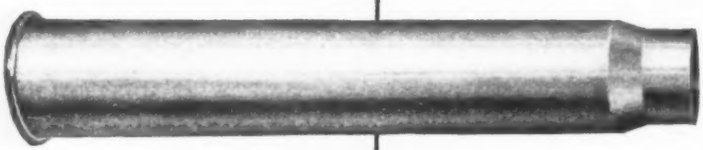
ALCOA
ALUMINUM

How to make shorter work of finishing* problems

** in plating * in "painting" * in chromate-treating*

You take effective action on metal finishing problems when you contact United Chromium . . . a source that is already providing many companies with the help they need on ordnance finishing. Nearly 25 years' experience, together with a line of outstanding metal and organic finishes, stand ready to help you too if you have to apply unfamiliar finishes . . . or want to improve present finishing operations. Here are just three examples of how working with "Unichrome" Coatings for Metals cuts expenses and satisfies specifications in shorter time and with less trouble.

INCREASED OUTPUT OF HARD CHROMIUM PLATING
Increases of from 20% to 80% in plating speed have been obtained by plating in the Unichrome *Self-Regulating High-Speed* Chromium Bath instead of the ordinary bath. Recent records reveal that piston ring plating took 3½ hours instead of 5. Aircraft brake discs were done in 40 minutes instead of the former 65 minutes. The bath also minimizes control problems because of its self regulation. This feature saves additional time, minimizes rejects.



MASS PRODUCTION OF A CHROMATE FINISH ON ZINC The Anozinc* process for zinc plate uses current to form a black, yellow or clear chromate finish with superior corrosion resistance and extra toughness. It uses conventional plating equipment, permitting fast, continuous processing of such parts as steel shell casings, die castings, propeller blades. Parts can be handled while still wet.

APPLY DURABLE PROTECTION AGAINST CORROSION
Ucilon* Protective Coatings add durability to products exposed to tough, corrosive conditions. These include intermittent or continuous contact with fumes or solutions — with acids, alkalies, salts, alcohols, moisture, oils, greases, chemical compounds, detergents and other products. Also available: Unichrome Lacquers and Enamels that meet requirements for quick-drying, lustreless protective coatings.

More information on these and many other problem-solving finishes are as close as the nearest United Chromium office. Write or phone us on *your* needs in finishes for metals. **Trade Mark*

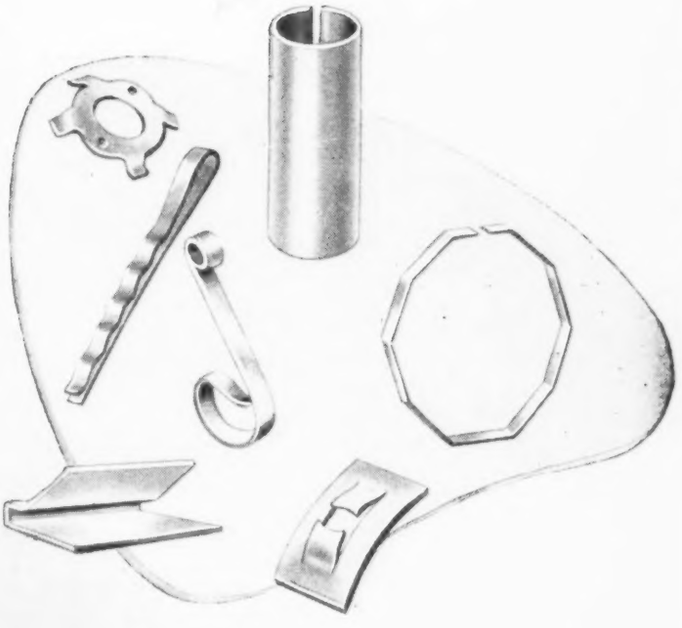
UNICHROME Trade Mark **COATINGS for METALS**

UNITED CHROMIUM, INCORPORATED 100 East 42nd St., New York 17, N. Y.

Waterbury 20, Conn. • Detroit 20, Mich. • Chicago 4, Ill. • Los Angeles 13, Calif. In Canada: United Chromium Limited, Toronto, Ont.

PEARLITIC—Temper-rolled in controlled hardness and strength for blanking.

SPHEROIDIZED—Annealed, soft and ductile—ideal for cold forming operations.



for blanking ...or forming

it's easier when you use WEIRTON HIGH-CARBON STRIP COLD-ROLLED SPRING STEEL

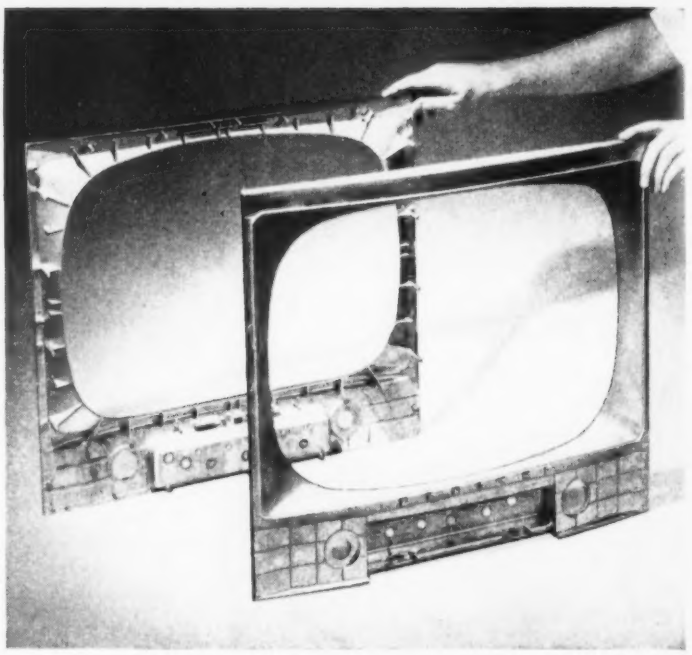
Either for blanking or for forming, there is a Weirton cold-rolled spring steel having special qualities and properties that make the operation easier to perform and make the manufactured product better. You will always get consistent results, too—because Weirton's close control over every step of manufacture assures constant uniformity.

You can count on Weirton High-Carbon Strip cold-rolled spring steel . . . for accurate response to heat treatment —uniformity of gauge and width—uniform chemical and physical properties—exact constancy of grain structure —controlled decarburization limits.

Weirton High-Carbon Strip is obtainable with the desired chemical analysis and for specific heat treating and hardness ranges, in widths up to seven inches.

WEIRTON STEEL COMPANY
WEIRTON, WEST VIRGINIA

NATIONAL STEEL CORPORATION



get the mo$t for your Zinc Die Ca$ting Dollar!

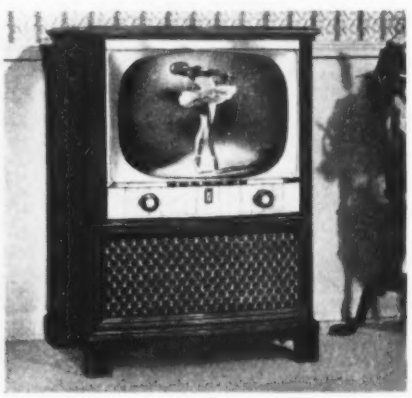
The combination screen and control panel escutcheon for the latest Zenith 21-inch television receiver—shown from both sides above—embodies most of the design and production advantages offered by ZINC Die Casting. How else could the escutcheon have been produced at comparable cost? Consider these details:

1. Many machining and assembling operations are avoided since all projections, recesses and openings are cast or cored with a high degree of dimensional accuracy in the die casting operation.

2. Cost is further minimized by the high speed at which the ZINC Alloy is cast in a hot chamber die casting machine.

3. Section thicknesses are kept at a minimum to conserve both metal and weight (note the strengthening ribs in the rear view) and there is no scrap loss.

4. Not only are decorative effects faithfully reproduced on the face of the escutcheon, but raised lettering is cast with clean-cut detail (see engraving in the recess behind the control panel door at the left below). The smooth cast surfaces permit low cost finishing with modern organic coatings to provide a gold plated appearance.



GET DESIGN DATA EARLY

The surest way to realize the full physical and economic advantages of ZINC Die Castings is through consultation with a competent die casting engineer in the *early* design stages. Ask any die casting company for help and ask them—or us—for a copy of "Designing For Die Casting."

The New Jersey Zinc Company
160 Front St., New York 38, N.Y.

ZINC
FOR DIE CASTING ALLOYS

The Research was done, the Alloys were developed, and most Die Castings are based on

HORSE HEAD SPECIAL (99.99 + % Uniform Quality) ZINC

tool steel is our pride and joy!

Think of tool steel — think of Crucible! That's the reputation we've had for over half a century with our tool steel users. We've never stopped working to maintain our leadership . . . leadership that has kept us the country's *number one* tool steel producer.

Crucible research and development continues to match Industry s need for new and improved tool steels. You can profit from the experience gained by Crucible in the application of tool steels to thousands of uses. Our metallurgical service is freely available to you . . . and our conveniently located warehouses maintain a full supply of tool steels for prompt delivery.

SEND TODAY for the unique Crucible Tool Steel Selector — a twist of the dial gives the tool steel for your application.

Rex® High Speed Steels
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Halcomb 218
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CSM 2 Mold Steel
La Belle® Silicon #2
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SPECIFY YOUR TOOL STEELS BY THESE BRAND NAMES

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Dept. I, Chrysler Building, New York 17, N. Y.

Name_____

Company_____ Title_____

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9″ diameter, 3-colors

CRUCIBLE first name in special purpose steels

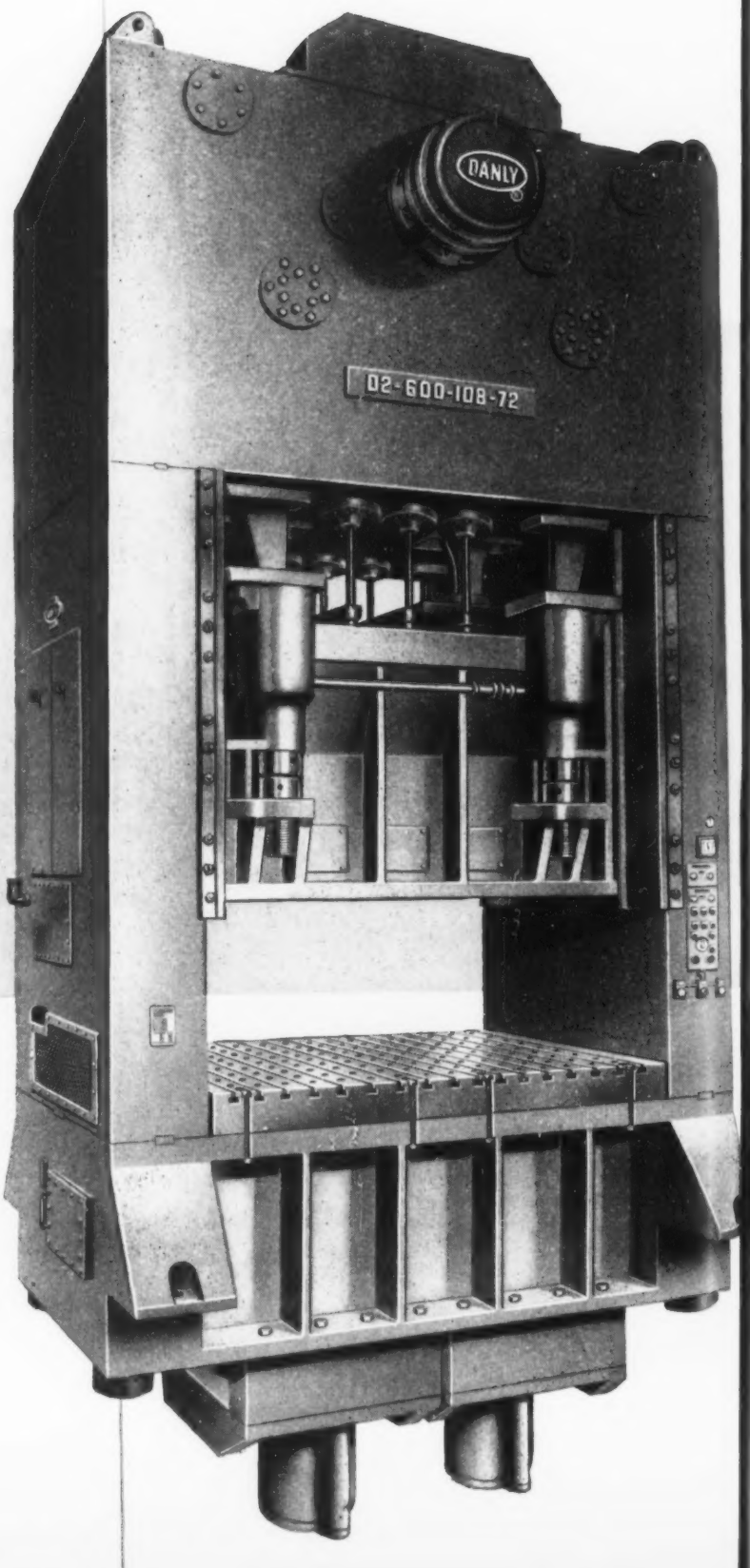
52 years of Fine steelmaking

TOOL STEELS

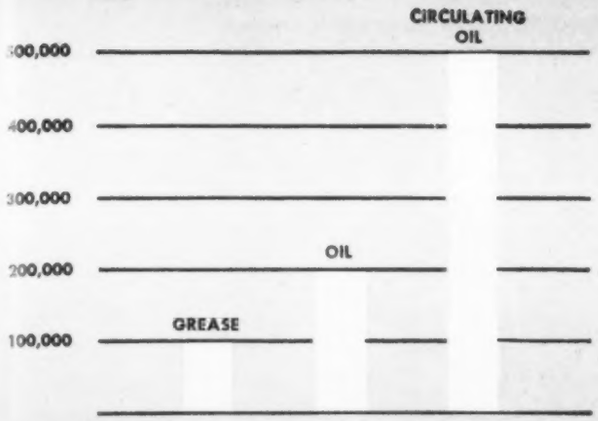
CRUCIBLE STEEL COMPANY OF AMERICA · TOOL STEEL SALES · SYRACUSE, N. Y.

check your maintenance records!

DANLY



SAFEGUARDED BY AUTOMATIC OIL LUBRICATION
View of 600-ton Danly Double Action Press featuring automatic *oil* lubrication to all wear points. Pressure system permits automatic safeguards against lubrication failure.



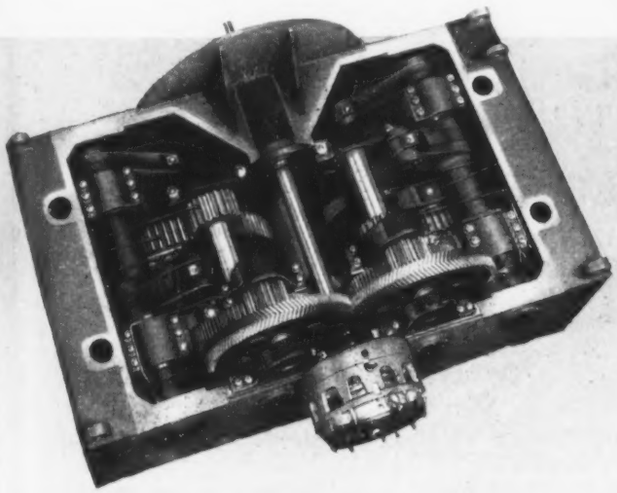
CIRCULATING OIL GIVES GREATER PROTECTION

Chart showing superiority of circulating oil lubrication for anti-friction bearings. Values at left represent bore of bearing in millimeters multiplied by speed in rpm . . . an accepted method for expressing limits of efficient bearing operation.

PRESSES

Actual day by day maintenance records in some of the country's biggest plants prove the importance of bearings in over-all press maintenance cost. The same records prove the cost advantages of Danly's automatic *circulating oil* lubrication system. Bearings wear longer because they run cooler and cleaner, continuously supplied with the proper amount of filtered oil lubrication.

Routine maintenance is reduced because periodic oiling or greasing is eliminated. The hazard of lubrication failure due to neglect or breakdown is eliminated by automatic safeguards. For the best in presses, come to DANLY.



CIRCULATING OIL TO ALL ANTI-FRICTION BEARINGS

Danly first and second intermediate shaft and drive shaft bearings, indicated in color in this exposed crown view are all anti-friction type, lubricated by filtered circulating oil. Cooler, cleaner operation prolongs life.

DANLY®

MECHANICAL PRESSES . . . 50 to 3000 TONS
HYDRAULIC METALWORKING EQUIPMENT

For complete details on outstanding Danly Press features . . . construction, drive, lubrication or operation . . . send for the Double Action Press Catalog today! Danly engineers are at your service.

DANLY MACHINE SPECIALTIES, INC.
2100 South Laramie Avenue, Chicago 50, Illinois

It costs less to run a DANLY PRESS!

Single Action Straight Side

Autofeed

Underdrive Single, Double Triple Action

Gap Frame

Double Action Straight Side

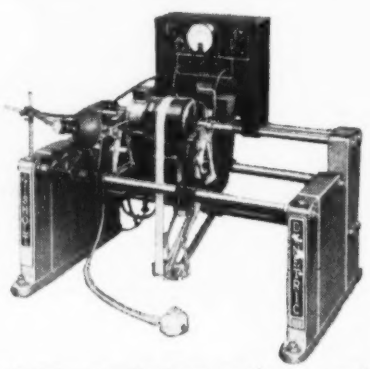
the final *check* for every rotating part . . .

Maybe it's a crankshaft or an armature . . . perhaps a fan or a belt pulley. No matter. The important thing is this: If it isn't *balanced,* it isn't ready for service.

Smooth operation and long life require that accurate static and dynamic balance be rated right along with mechanical specifications . . . incorporated in the blueprints. Then, no vibration, however slight, may lower the efficiency of the finished product.

Gisholt Balancing Machines can locate and measure unbalance vibrations down to .000025″ with simple readings . . . handle any assembly from ½ ounce to 50 tons.

The cost? Very moderate. That's why so many manufacturers insist that their products have the final check which only Gisholt Balancing Machines can provide.



Gisholt Balancing Machines, made in a variety of sizes and types, can also be furnished with correction equipment designed to meet your specific requirements.

THE GISHOLT ROUND TABLE *represents the collective experience of specialists in the machining, surface finishing and balancing of round and partly round parts. Your problems are welcomed here.*

GISHOLT MACHINE COMPANY
Madison 10, Wisconsin

DYNETRIC BALANCERS — GISHOLT — DEVELOPED JOINTLY WITH WESTINGHOUSE ELECTRIC CORPORATION "DYNETRIC" IS A TRADE MARK REG. U. S. PAT. OFFICE BY WESTINGHOUSE ELECTRIC CORPORATION

TURRET LATHES • AUTOMATIC LATHES • SUPERFINISHERS • BALANCERS • SPECIAL MACHINES

MICROHONING is in your future

REFRIGERATOR COMPRESSORS

AIRCRAFT ENGINES

HYDRAULIC CONTROLS

GUN BARRELS

TRACTOR PARTS

AUTOMOTIVE ENGINES

if your operation requires the generation of accurate cylindrical or flat surfaces.

Hundreds of industrial plants have found that Microhoning not only improves the quality of the surface, but also increases production—reduces scrap, handling, and inspection costs.

No, you do not need a crystal ball.

The potentials of the Microhoning process can best be judged by the past accomplishments and present policy of the organization that developed it.

To give industry a complete service, the Micromatic Hone Corporation has an organization and sales policy unique in the machine-tool business. One well-coordinated organization sells, engineers, builds, and services the complete installation. Micromatic assumes full responsibility for all the equipment and the results obtained with the Microhoning process.

MICROMATIC HONE CORPORATION · DETROIT

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MICRO-MOLD MFG. DIV.
Boston Post Road
Guilford, Connecticut

MICROMATIC HONE CORP.
614 Empire Building
26 So. Main Street
Rockford, Illinois

MICROMATIC HONE CORP.
MICRO-MOLD MFG. DIV.
231 So. Pendleton Avenue
Pendleton, Indiana

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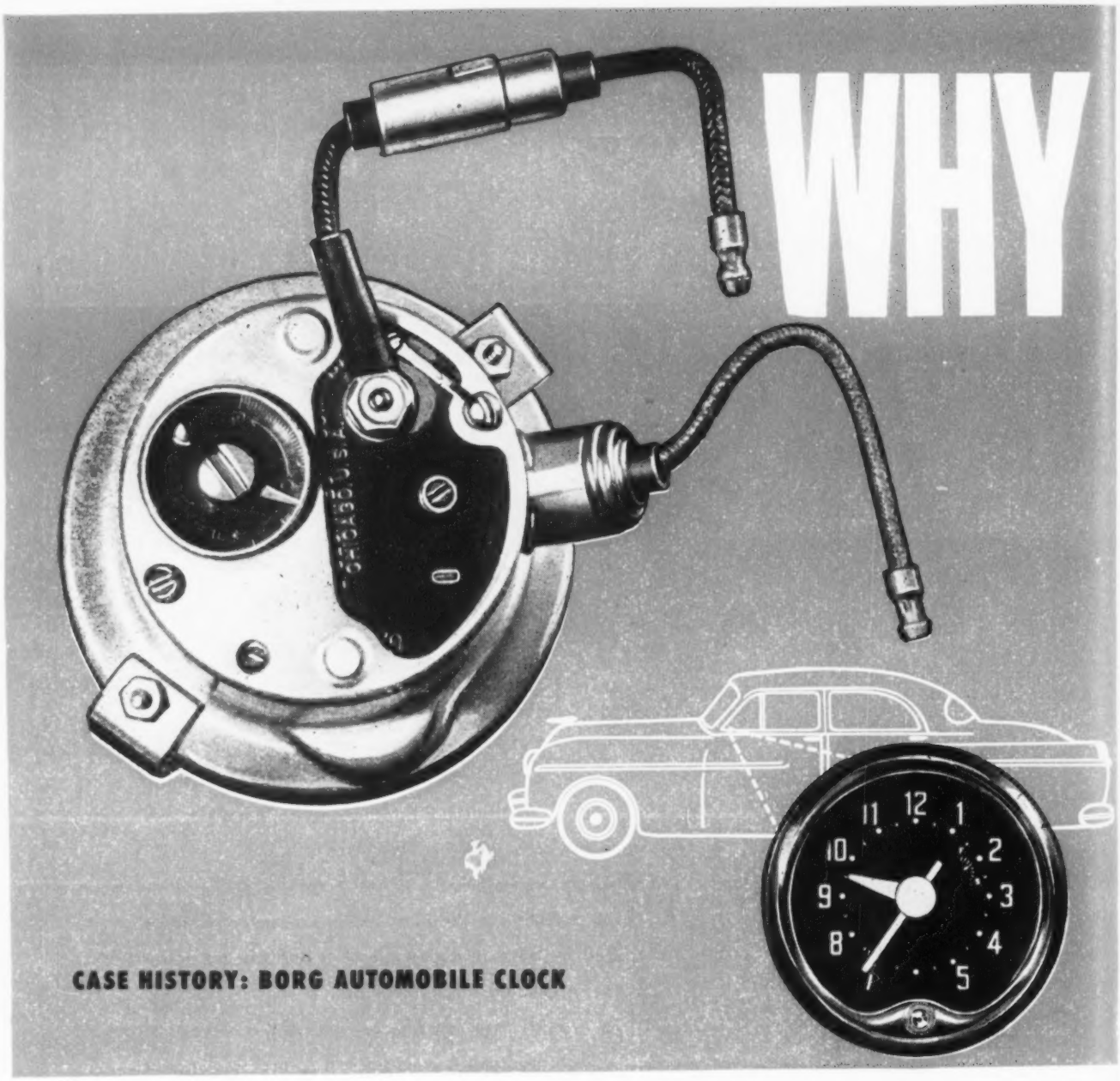
1323 S. Santa Fe Avenue
Los Angeles 21, California

MICROMATIC HONE LTD.
55 George Street
Brantford, Ontario, Canada

REPRESENTATIVES: *OVERGARD MACHINE TOOL COMPANY, 234 Commonwealth Bldg., Denver 2, Colorado*
HALLIDIE MACHINERY CO., 2726 First Ave., South, Seattle, Wash. • *REPRESENTATIVES IN ALL PRINCIPAL COUNTRIES*

MICROHONING — STOCK REMOVAL + GEOMETRY + SIZE CONTROL + SURFACE FINISH



A switch to aluminum for parts of this Borg automobile clock eliminated electroplating, lengthened tool life, increased machine output and reduced shipping, handling and assembly costs . . . each one a good answer to the question, "Why Aluminum?"

When these clock cases, brackets and inside anchor plates were made of another metal, they had to be electroplated to guard against rust and to give them an attractive appearance. Now, as a result of changing to aluminum, electroplating is no longer needed because aluminum requires no protection and has a naturally attractive, permanent appearance.

Converting to aluminum provides other definite manufacturing advantages, too. Tools do their work easier because aluminum is more easily fabricated in press operations—thus aluminum greatly extends tool life. Also, due to the ease of working aluminum, presses run at higher speeds and for longer periods of time between reworking of dies—thus aluminum increases machine output.

Thanks to aluminum, the overall weight of this electrically operated automobile clock is now 31% less. This lowers transportation costs in shipping from manufacturer to auto assembly plant, reduces handling costs in the plant and provides faster, easier assembly into the automobile.

Chances are, some or all of the manufacturing advantages of aluminum found by the George W. Borg Corporation, Delavan, Wisconsin in making this clock can also apply to your operations. Chances are, aluminum can also make your products better.

LET ALUMINUM SERVE YOU, TOO

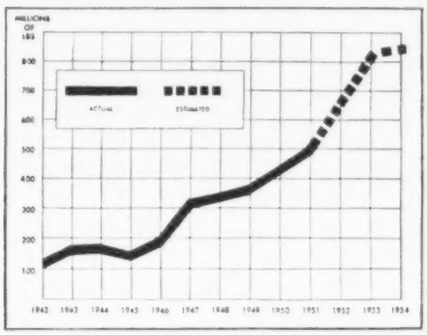
ALUMINUM?

...because it has an ideal combination of advantages found in no other metal!

More aluminum is being specified in designs today because aluminum improves products and increases sales. Let Reynolds Aluminum Specialists help your designers and engineers get maximum benefits from this modern metal. Remember, only aluminum gives you . . .

- **Lightweight with great strength**
- **Consistently low cost**
  no more than before World War II
- **Natural resistance to rust and corrosion**
- **Attractive appearance**
- **Ease of fabrication by modern methods**

STILL MORE ALUMINUM COMING



The expanding primary aluminum production of Reynolds Metals Company . . . a historic chapter in the company's 33 years of continuing growth. And primary supplies of aluminum ore will be ample for generations.

To the man in charge of production

Acquaint yourself with accepted techniques for fabricating aluminum. Write on your letterhead for aluminum fabrication books listed at right. On special problems consult with Reynolds staff of aluminum specialists. Reynolds Metals Company, 2526 South Third Street, Louisville 1, Kentucky.

Yours For The Asking . . . REYNOLDS TECHNICAL BOOKS

(please request on business letterhead)

- Aluminum Data Book
  (Aluminum Alloys and Mill Products)
- Aluminum Structural Design
- Designing with Aluminum Extrusions
- Fastening Methods for Aluminum
- Finishes for Aluminum
- Forming Aluminum
- Welding Aluminum
- Machining Aluminum Alloys
- Heat Treating Aluminum Alloys
- Metals Weight Slide Rule

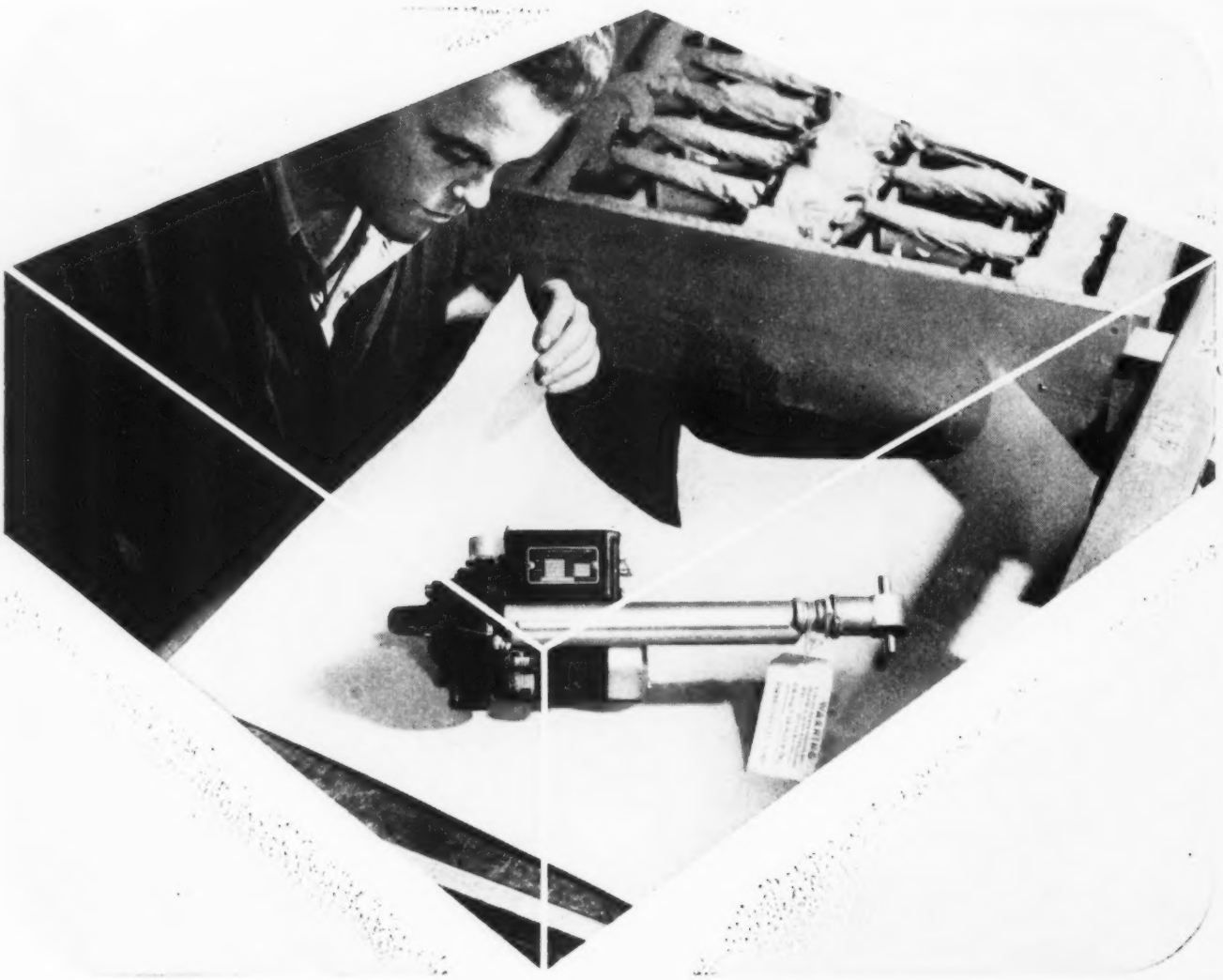
Complete index of all technical literature and films on aluminum design and fabrication also available.

See "Doc Corkle" with Eddie Mayehoff, Sunday night, 7:30 EST and PCT, NBC-TV; hear "Fibber McGee and Molly" Tuesday night, 9:30 EST, NBC.

REYNOLDS ALUMINUM

REYNOLDS METALS

MODERN DESIGN HAS ALUMINUM IN MIND



Shell "VPI"-protected airplane parts. Over 1,000 different parts stored for over a period of a year—all wrapped in Shell "VPI" paper—no rejects due to rusting.

New packing technique HALTS RUST DAMAGE ... cuts packing costs as much as 60%

THE GOOD WORD AMONG steel packagers and shippers today is that rust can now be prevented by Shell VPI® (a volatile corrosion inhibitor). Composed of solid amine nitrites, Shell "VPI" vaporizes and when moisture is present in the air . . . renders this moisture noncorrosive. Containers need not be airtight, however, for excellent corrosion protection.

In terms of packing costs, this new technique is so much simpler and faster that costs have been cut as much as 60%.

This can be traced directly to the fact that Shell "VPI" may be applied quickly and easily in either crystalline form or as a coating on wrapping paper. Hence rust-preventive measures are greatly simplified and container costs are reduced. And, of course, rust removal before the product's use is unnecessary.

Other major advantages of Shell "VPI" are: Low cost . . . Long periods of volatility . . . Nontoxic . . . Elimination of greasing and degreasing . . . Harmless to plastics or ferrous metals.

Consult your Shell Representative about this new method of rust prevention today. Or write to nearest address listed below.

SHELL OIL COMPANY

50 West 50th Street, N. Y. 20, N. Y.
100 Bush Street, San Francisco 6, Calif.

SHELL

SHELL "VPI"

(a volatile corrosion inhibitor)

stops air and moisture from making rust.

for economy in coiling,
knotting, forming —

use **Pittsburgh**

Oil Tempered SPRING WIRE

Day after day, in plant after plant Pittsburgh Oil Tempered Spring Wire is proving that it has the acceptance of production managers and machine operators alike. They find it has the uniform size accuracy and ductility to work smoothly in coiling, knotting, and forming machines. This reduces time; keeps production records climbing. That is why it pays to specify Pittsburgh Oil Tempered Spring Wire. It has the quality, proved in use that gives you economical production runs. For information write Department IA, Grant Building, Pittsburgh 30, Pa.

Pittsburgh Wire

A product of **PITTSBURGH STEEL COMPANY**

Banner STANDS FIRST!

FIRST in DESIGN — Original design features created by Banner make it first and foremost in the welding field.

FIRST in QUALITY — Built to highest engineering standards. True quality construction throughout.

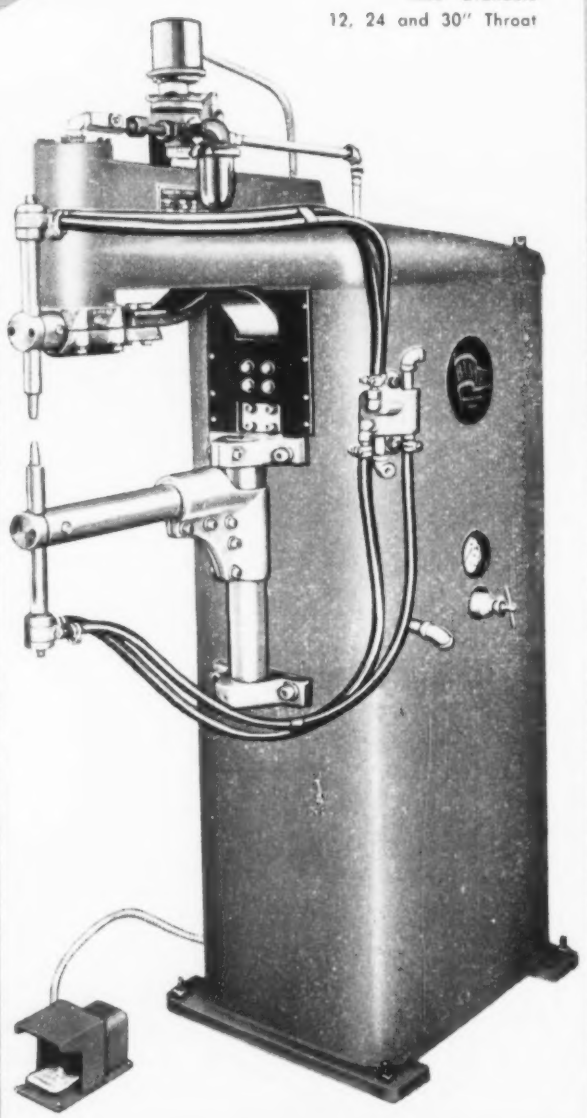
FIRST in PERFORMANCE — Does your job faster and better, to raise plant production and efficiency.

ONLY BANNER OFFERS ALL THESE FEATURES...

- ★ Banner Welders can continuously and accurately weld up to 225 spots a minute.
- ★ Time tested proof of a Banner development is the original design of ram and cylinder and the long bearing surface of 7".
- ★ Up to 7" adjustment on lower knee. (Unit is available up to 30" throat.)
- ★ Heavily ribbed cast iron head, with integrally cast cylinder provides utmost rigidity. Manganese Bronze piston specially equipped with 3 cast iron double seal (automotive type) rings reduces friction up to 50%, thus permitting necessary follow-up after welding cycle.
- ★ Heavy duty selector with contacting pads of ample cross section provides 8 stages of heat regulation.
- ★ Secondary and secondary pads are water-cooled assuring dissipation of heat in high speed operation.

Banner manufactures a complete line of Gun, Seam, Rocker Arm and larger Press Welders to 200 KVA and Specials. Inquiries invited.

BANNER
SPOT WELDER
Model SPA
10, 20, 30 and 50 KVA
18" Throat shown
Also available
12, 24 and 30" Throat



BANNER Manufacturing Co.
6812 NORTH 43rd STREET • MILWAUKEE 9, WIS.

What's the Connection?

If there's a furnace operation in your setup . . . there's a mighty big connection between the CITIES SERVICE HEAT PROVER and your profit and loss picture.

Heat Prover—not an instrument you buy, but a service we supply—helps to increase furnace productivity through these five unique advantages:

1. **Rapid, continuous sampling.**
2. **Simultaneous reading of oxygen and combustibles.**
3. **Direct measurement of oxygen and combustibles.**
4. **Easy portability.**
5. **No maintenance; no re-calibration.**

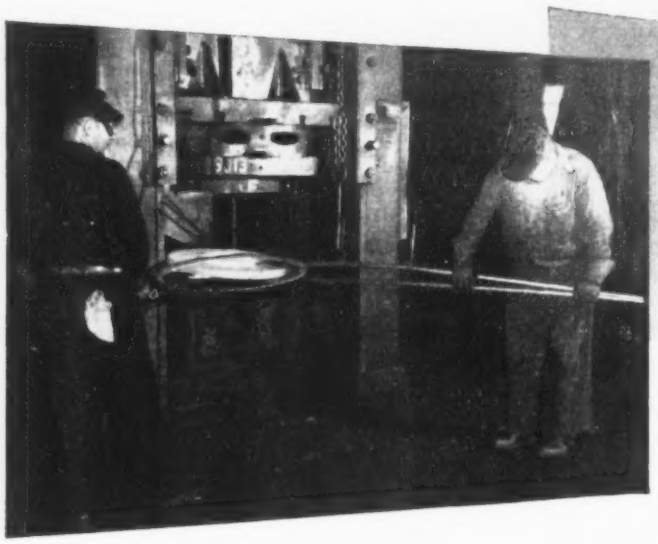
ACCURATE, FAST CITIES SERVICE HEAT PROVER ANALYSIS CAN PUT THE FINGER ON WASTE IN YOUR FURNACE OPERATION. It's being widely used in a great variety of industries. Find out how Heat Prover can serve you. Write Cities Service Oil Company, Dept. K16, Sixty Wall Tower, New York City 5.

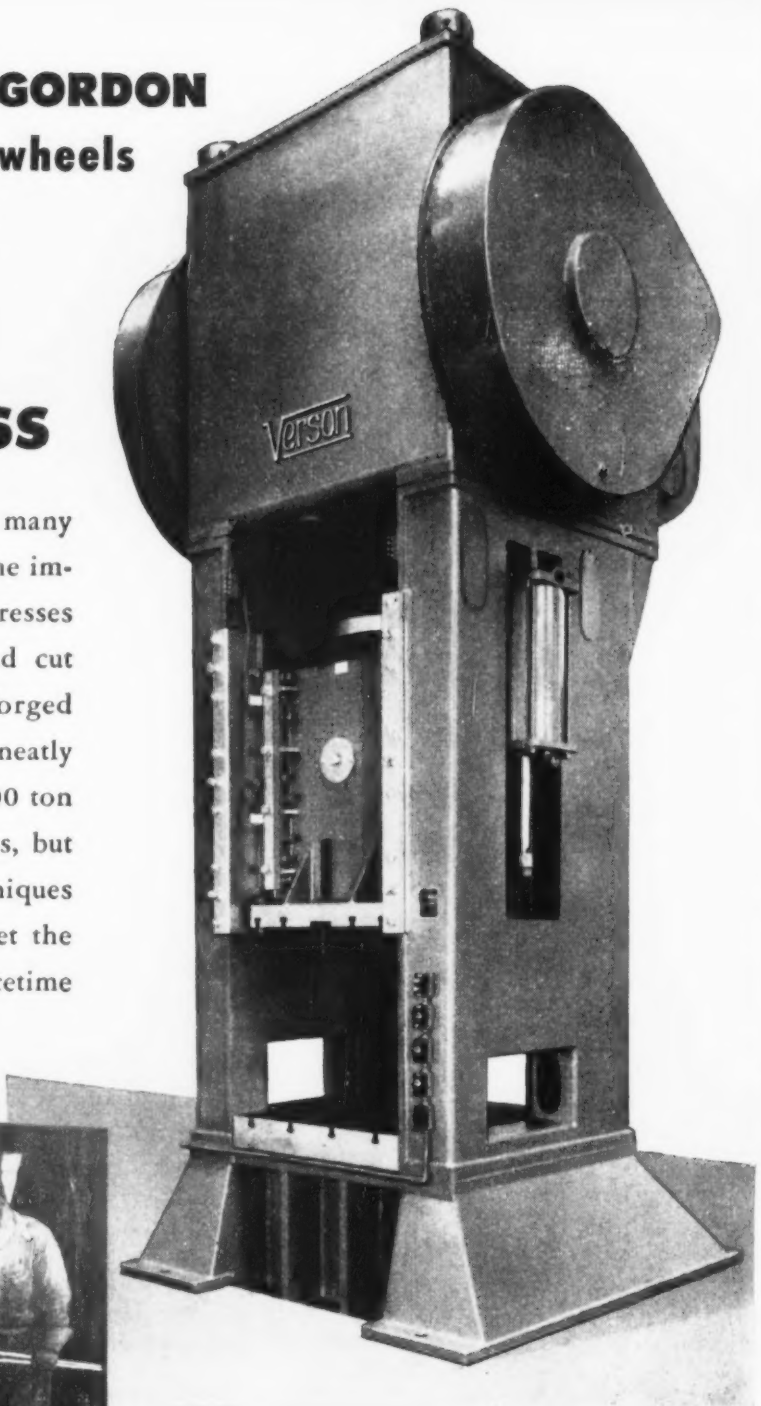
CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

Here's How WYMAN-GORDON trims jet engine turbine wheels with a 600 ton Verson CRANK TYPE PRESS

At Wyman-Gordon Company, as in many plants engaged in the production of the implements of defense, modern Verson presses are helping to speed production and cut costs. Take the job illustrated below—forged jet engine turbine wheels are trimmed neatly and quickly in a single stroke of a 600 ton Verson crank type press. Routine, yes, but it is the sum of such production techniques as this that enable our plants to meet the demands of a part war—part peacetime economy.





Illustrated above is the 600 ton Verson single crank, single action, double gear twin drive press. Bolster area, F.B. x R.L., is 56" x 48". At left the piece being removed from the press after trimming.

A Verson Press for every job from 60 tons up.

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

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The Iron Age
FOUNDED 1855

THE IRON AGE Newsfront

AUTO OWNERS LIKE POWER STEERING. Makers of power steering units are hard pressed to meet industry demands for 1953. The public has gone for easy steering in a big way and independents without a supply source are scrambling to get on board.

FAST CONVERSION TO MILITARY USE is behind the new policy to design and build some commercial transport planes to conform with Civil Reserve Air Fleet specifications. Some transports now in production will be modified with Air Force bearing the cost.

RUSSIA HAS 4000 ELECTRO-EROSION MACHINES IN OPERATION some American sources estimate. But latest American models can outproduce them 100 to 1. Russia's been using the method on easily-machined materials, U. S. on non-machinable materials.

FEWER JET ENGINE FAILURES AT LOW ALTITUDES are in prospect. Most failures have occurred on take-offs. Now a simple method has been found to prevent stalling of the jet engines at low altitudes.

LAST ORE BARGES OF THE SEASON have passed through the Soo Locks as navigation on the Great Lakes slowly comes to a halt. Only steamers under their own power will pass through the Locks from now until the season closes.

GAMBLE ON A NEW PRODUCT in what looked like a glutted market paid off for an appliance maker. Sales of a new molded plastic portable refrigerator passed its most optimistic estimates. Original dies cost over $70,000. Now a new set is being made to double output.

MORE WAREHOUSES WILL SOON HANDLE MAGNESIUM. A single West Coast distributor has been handling the light metal for about a year and a half. Arrangements are now being made for warehouses in the East and other areas to stock magnesium in common forms.

STEEL PRODUCTION THIS YEAR is expected to total 93.4 million net tons of ingots compared with 105.1 million tons last year. And finished steel shipments may reach 68.9 million net tons as against 78.9 million tons last year. Though the comparison looks bad, it's a notable achievement. Nineteen million tons of raw steel production were strike lost.

OUTPUT OF JET ENGINES is rising faster than production of aircraft, reflecting partly the shift from piston to jet propulsion. Total jet deliveries are now 50 pct above last January.

LOCATION OF NEW MANUFACTURING PLANTS IN RURAL SECTIONS where there were no plants before drastically changes travel habits. Workers may come from as many as six towns, some 30 to 40 miles away. Older plants find workers' travel picture changing too. One plant reports close to 50 pct of its workers traveling 20 or more miles a day to work.

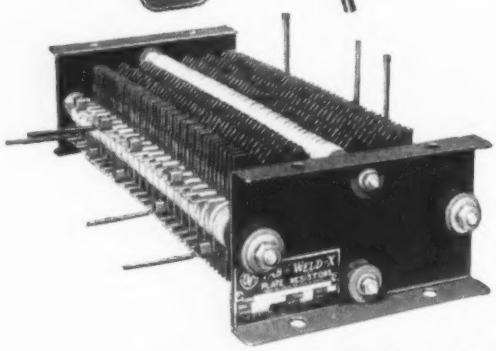
PROGRESS REPORT FROM BRAZIL. An additional blast furnace and two new openhearth furnaces will be completed at Volta Redonda by Dec. 1953. Hot-rolling stands will be increased from four to five; cold-rolling stands from three to four; cokeovens from 55 to 76.

NEW RESISTORS

for Small H.P. Controllers

WELDED Design Gives Many Advantages

Note top and bottom rows of grids with taps welded in place at the end of each grid. No intermediate taps on active material.



Standard mill section, 26½" long—also available in 18" and 12½" lengths.

Spot-welded to insure continuous current-path.

NOW, a standardized line of Welded Plate Resistors by EC&M for small HP controllers—below the range of the well known and popular TAB-WELD Sections for large motor applications.

These new TAB-WELD-X Plate Resistors have all the advantages of the larger sections: corrosion-resistant material—practically constant resistance-values between cold and working temperatures—clamp terminals—internal clamping-nuts maintain uniform overall dimensions—grids joined by welding—terminal-plates welded at the end of each grid for easy adjustment of resistance-value and providing strong supports for external connections.

Other inherent advantages are: no intermediate taps on active material—external leads along either side—lead-insulation not subject to resistor-heat—liberal spacing between grids (⅜") gives high heat radiation.

New Bulletin 942-B illustrates, describes and gives ratings of these new EC&M TAB-WELD-X Plate Resistors.

Write for your copy

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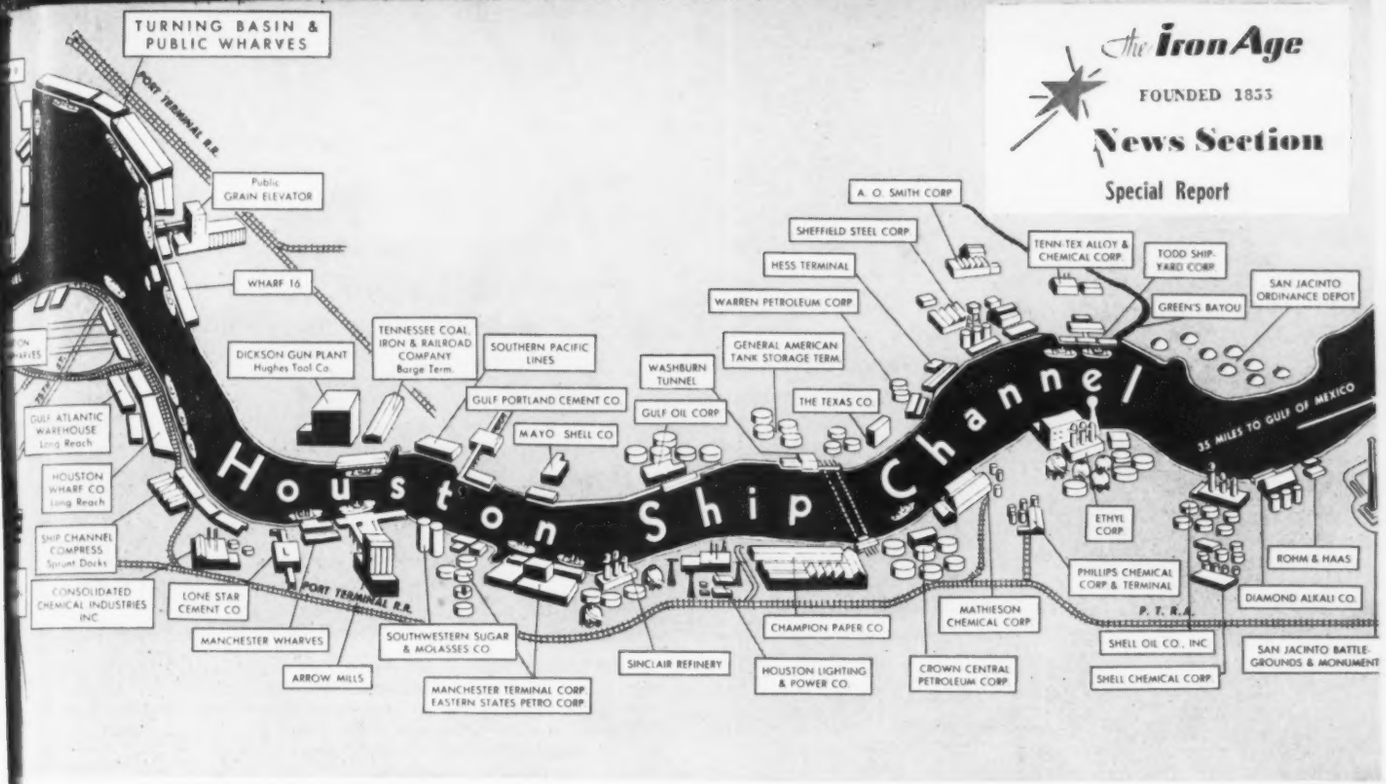


HOUSTON: Gulf Coast Petro-Chemical Hub

City is center of mighty industrial empire . . . Ship channel makes port rank second only to New York . . . Research unlocked booming petro-chemical field—*By W. V. Packard.*

Houston is the hub of a mighty industrial empire burgeoning on the Texas Gulf Coast. Its transformation from a frontier village overlooking a muddy bayou to the largest metropolitan area of the South has occurred with breath-taking speed. Between 1940 and 1950 its population jumped from 21st to 14th place among U. S. cities.

Today, the muddy bayou is the 50-mile-long Houston Ship Channel whose banks are lined with a billion dollars of still-growing industry. The channel has unlocked the city, making it a deep water port, and transforming it into an industrial and commercial center of fantastic wealth.

The Corps of Engineers ranks the Port of Houston second in the nation (New York is first). Last year it handled over 45 million tons of commerce. Shipments are heavier this year.

An industrial expert told us that Houstonians owe their good fortune to the "holy trinity of sulfur, salt, and natural gas." He probably should have added, "And to the men, machines, and methods that have unlocked and utilized the earth's treasures."

There's no doubt that Houston area is booming. In fact it is a myriad of little booms within a big one. Trying to sort them and evaluate them is no easy task.

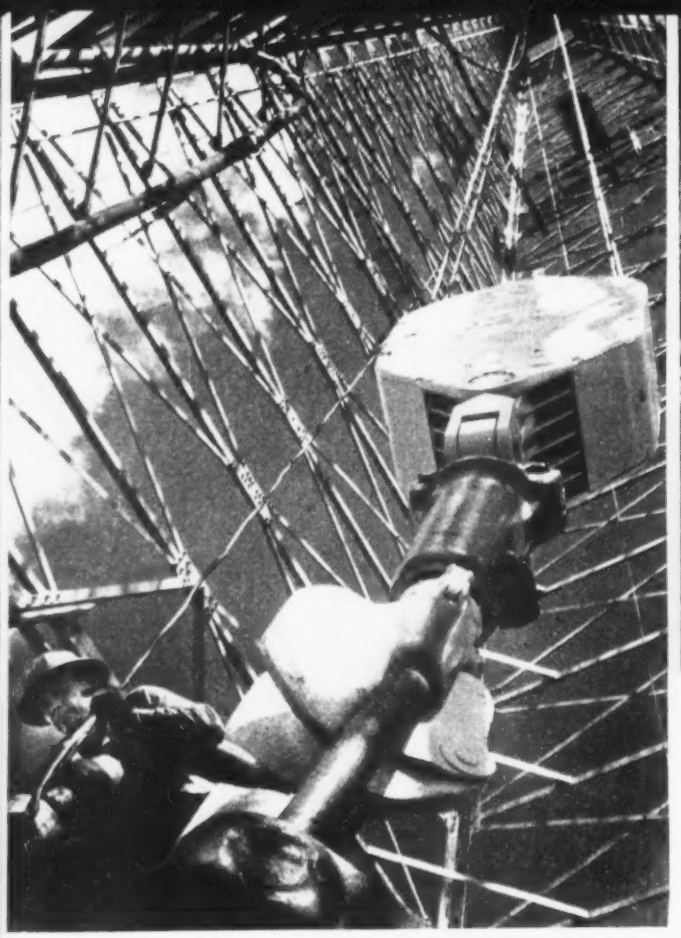
Petro-Chemicals — Perhaps the biggest and most spectacular boom is in petro-chemicals. This all-inclusive title covers a multitude of products ranging from synthetic rubber to styrene and other plastic materials to fountain pens. It is primarily an industry producing chemicals from hydro-carbons.

Research proved the key to this whole new area of technology. Beginning in 1940 they learned to make synthetic rubber out of chemicals derived from petroleum gases. Result: A mighty new industry. But this was only the beginning. Simultaneously research was unlocking other new products so fast the statisticians couldn't keep up. They are still discovering new products at a rate of 50 or 60 a year, and there is no end in sight.

Texas' billion dollar petro-chemical industry is still growing at a phenomenal rate. Over the past 20 months it has planned more than $1 billion in expansion, has appropriated in excess of $263 million for 70 expanded facilities, most on the Texas Gulf Coast.

The $263 million does not include a plant to be built by Du Pont near Beaumont, beginning early in 1953. Over the past 8 months the largest project reported was that of Union Carbide and Carbon Co. for a $66-million plant at Texas City.

Expansion Plans—Reports from expanding chemical companies to the Houston Chamber of Commerce as of the first of this year showed: Plant investments by 56 companies representing more than 70 plants totaled approximately $950 million. Expansion in progress by 18 reporting companies totaled nearly $90 million. Contem-



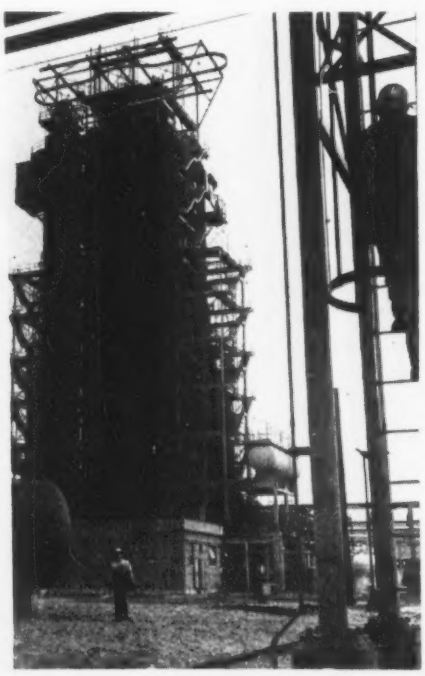
MEN AT WORK: Roughneck attaches mud line on Shell Oil rig (left), a man-sized job by any standard. Above another oil worker uses strong arm tactics on derrick floor of a Humble well near Houston. Within 100 miles are 268 fields producing 200 million bbl per year. There are 14 large refineries. Below is scene in National Steel Products Corp.'s new Houston warehouse.

Metalworking Employees in Houston

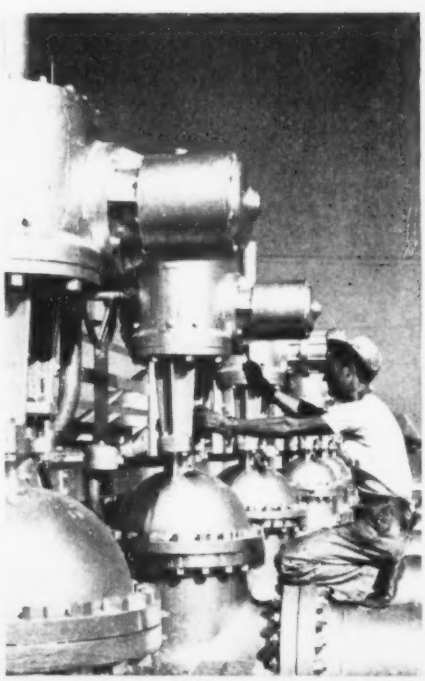
TYPE OF INDUSTRY	May 1947	May 1951	May 1952	Gain in Past 5 Years	Gain in Past Year
Ordnance and Accessories	—0—	770	3,820	3,820	3,050
Primary Metal Products	3,949	5,600	8,925	4,976	3,325
Fabricated Metal Products	4,877	7,075	7,585	2,708	510
Machinery (except electric)	11,954	14,075	16,085	4,131	2,010
Electric Machinery	520	540	690	170	150
Transportation Equipment	1,241	1,550	2,035	794	485
Total	22,541	29,610	39,140	16,599	9,530

Percentage of Increase Since May, 1947—73.6 pct

Percentage of Increase Since May, 1951—32.19 pct



BOOM: A 20-story-high styrene distillation tower of Monsanto is big investment.



CHECKING: Automatic manifold system at Shell pipe line tank farm.

MONUMENTS: Fractionating columns at gasoline plant need plenty of steel.

plated expansion during 1952-1954 by 20 reporting companies totaled nearly $250 million. Total investment in chemical plants in the Gulf Coast belt, including those under construction, amounts to nearly $1.3 billion.

Defense Production Administration hopes productive capacity of 43 important chemical materials can be increased 50 pct from 1951 to 1955.

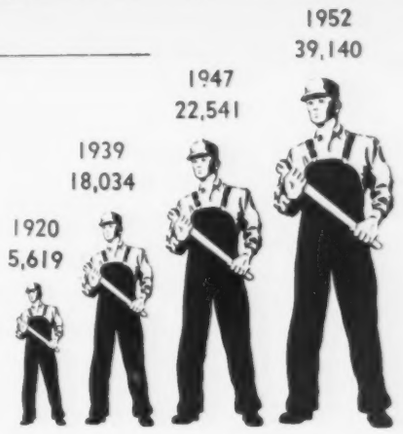
Raw material supplies of crude oil and natural gas are infinite. New reserves continue to be discovered faster than they are used.

Reserves—Texas accounts for 56 pct (18.2 billion bbl) of U. S. reserves of crude oil and other liquid hydrocarbons. Its natural gas reserves amount to 55 pct (105 trillion cu ft) of the national total. Last year Texas accounted for 80 pct (2.6 billion bbl) of the national gain in crude oil reserves, and for 39 pct (3.2 trillion cu ft) of additional natural gas reserves.

The Houston area has been producing about 80 pct of annual sulfur output in the U. S. This share will decrease somewhat following discovery and exploitation of huge reserves in Louisiana by Freeport Sulfur Co. But the area will continue a very important producer of this vital industrial product.

Paralleling the lightning growth of sulfur, salt, oil and gas has been a fast-rising metalworking industry. Much of it is highly specialized, supplying such items as valves, pipe, fittings, pressure vessels and tanks to the basic growth industries. Steel warehouses are well represented, and do a thriving business.

Steel—Houston's basic steel producer, Sheffield Steel (subsidiary of Armco) has expanded five-fold since it poured its first steel in March, 1942. Located on the Houston Ship Channel, the firm celebrated its tenth anniversary by raising its capacity to the million-ton mark.



Total Employees In Metal Plants In Houston

Addition of a 100-ton electric furnace this year raises capacity by 18 pct, or about 150,000 tons per year. Balance of the capacity is provided by eight 157-ton openhearths. Small compared with national totals, it is most welcome and vitally needed by growing industry around Houston.

Sheffield has recently completed a million dollar ore treating plant at Rusk, Tex. It is already sending upgraded ore from east Texas to the firm's blast furnace in Houston.

In 1950 Sheffield joined with A. O. Smith Co., Milwaukee, to build a pipe mill next to its Houston plant. This mill is now turning out large diameter gas transmission pipe, helping make possible the great expansion of natural gas transmission. Pipe output is now at the rate of 100 miles per month.

Though not in the Houston area, Lone Star Steel in east Texas (Daingerfield) is an important supplier of pig iron to foundries in the area. It is proceeding with a $73 million expansion program. Construction of four 225-ton openhearths will establish it as an important steelmaking source in the area.

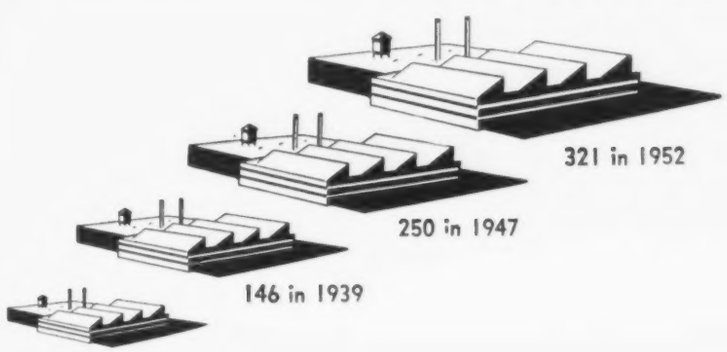
Light metals are growing there, too. The area is still buzzing over the spectacular beginning of an aluminum producing industry with location of two new plants southeast of Houston on the Texas Gulf Coast. Alcoa built the first at Point Comfort, a few miles north of Port Lavaca, in 1951. Cost was $43 million. Capacity was 50,000 tons per year. In June of this year $20 million of additional expansion brought capacity to 92,000 tons per year.

Last May the second huge aluminum plant was opened by Reynolds Metals near Corpus Christi. It cost $80 million and is currently producing at the rate of 80,000 tons per year. By the end of next year combined capacity of Texas aluminum smelters is expected to be 267,000 tons.

Altogether, more than $34 million has been spent to widen and deepen the Houston Ship Channel, as port officials strive to keep ahead of mushrooming industry and commerce. Deepening to 36 ft along its entire length and under the turning basin is being completed. The turning basin is 1100 ft in diam and can accommodate the largest tankers and freighters plying the channel.

Even while this work is underway, port authorities are pushing a new multi-million-dollar plan to deepen the channel to 40 ft, widen it at several points, and carve out a second huge turning basin.

A thriving machinery industry has sprung up to serve the expanding needs of oil, gas, chemicals, and other industries. Other important industries include a heavy apparatus division, rebuilding of tanks and other combat vehicles, production of mortar shells, and manufacture of a variety of containers and forgings and castings.



Total Houston Metal Working Plants in 1920 . . . 62

TOOLS: Builders Approve Easier M-41

Producers of machine tools at NMTBA convention view changes in distribution order as leading to greater sales . . . Fear distress market after defense boom—*By E. C. Beaudet.*

Further relaxation of the industry's distribution order, M-41, was greeted with hearty approval by members of the National Machine Tool Builders' Assn. at their annual meeting in White Sulphur Springs, W. Va., last week. The order as amended will permit a frozen period of 3 months prior to date of shipment during which non-rated orders for machines not on the critical list cannot be diverted to defense uses. Other revisions include a drop of from 70 to 60 in the percentage of service orders builders are required to take.

These changes in the distribution order will provide a stimulus to greater sales according to industry officials. Purchasers will be more willing to place orders for new equipment if they can be assured of delivery. Heretofore a customer was never certain of delivery until shipment was made. The ability of some firms to take more civilian business will undoubtedly add strength to the market and bring out more buyers.

Declining Market—Main problem facing the industry today is the prospect of a declining market once the peak of defense buying has passed. For some it already has. Distress in some companies both large and small has already resulted in revisions of 1953 production plans.

For others who make heavy equipment, defense business still plays a large part.

Expansion of facilities for making equipment that is applicable only to defense purposes is one of the difficulties both the industry and government must iron out if over-expansion once defense programs are filled is to be avoided or compensated for.

Foreign Inroads—Other obstacles to the continuation of a healthy level of machine tool production are the decline of our foreign market, inroads made by European builders in the U. S. market, and retention of present depreciation policies.

NMTBA ELECTS: New officers of the toolmakers' association are Swan E. Bergstrom, president; Herbert L. Tigges, first vice-president; M. A. Hollengreen, second vice-president and director. For company affiliations see story.

If the machine tool user is able to write off purchases of production equipment in a shorter space of time, builders can do a more effective job of replacement selling. The nation's industrial plant will be more modernized and better suited to the needs of an all-out national emergency. Small business will be better able to purchase the equipment needed to fill defense contracts.

Decontrol — One of the surest ways to strengthen the industry for defense work is a program of progressive decontrol as soon as it is warranted, according to F. S. Blackall, Jr., outgoing president of the association. The problem of tooling for national defense will be a long and drawn out one.

To meet the challenge at home and abroad the industry must be strong and aggressive. To achieve this it must be competitive. No subsidization is needed or wanted. All the industry asks is a recognition of its cyclical nature in dealing with taxation and renegotiation so that it will be better able to survive the lean periods.

Swan E. Bergstrom, vice-president of the Cincinnati Milling Machine Co., was elected president of the association. Herbert L. Tigges, executive vice-president of Baker Bros., Inc., Toledo, was elected first vice-president; M. A. Hollengreen, president of the Landis Tool Co., Waynesboro, Pa., was elected second vice-president and director and Francis J. Trecker, president, Kearney & Trecker Corp., Milwaukee, was elected treasurer. New directors, in addition to Mr. Hollengreen, were: J. C. Cotner, president, Hydraulic Press Mfg. Co., Mount Gilead, Ohio, and Alan C. Mattison, president, Mattison Machine Works, Rockford, Ill.

Small Business Contracts Grow

Total of $142 million worth of defense contracts has been earmarked for small business firms under the Federal Government's program to bring the maximum number of smaller companies into the current rearmament program. Actual contract awards totaling nearly $39 million have been made.

STEEL: Snag in Schuman Plan

Steel distribution plan based on geographical location fouled by customer demand for specified producers . . . Re-emergence of buyer's market adds trouble . . . Certification hurts trade.

The Schuman Plan which has been free-wheeling through international differences at a surprising clip may have run smack into a hidden roadblock.

One of the basic assumptions made by the planners of the Schuman steel pool was that supply and distribution of steel products would be determined by geographical location. Producers would service customers located nearest them.

With the exception of alloy steels, many European consumers don't care who supplies them. But the steel pool's Central Sales Office in Luxembourg is learning that there are others who do.

Pick and Choose—Some buyers are refusing to place orders with the Central Sales Office unless they are given the right of specifying the producer. This disturbs the Schuman steel pool principle of operating on a geographic basis.

As originally set up, the steel pool planners had hoped, for example, that rolling mills located near shipping ports would be able to specialize on export orders. Mill plate production from the Saar was to have been ticketed for the domestic market in southern France.

Buyers Market—Aggravating the problem of carrying out this plan is the re-emergence of a buyer's market in Europe. European customers are now able to demand that their wire nails come from a certain Belgian mill, their blackplates from a French producer, steel tubes from a Ruhr plant or barbed wire from Italy.

If the Luxembourg office tries to persuade them to take steel from another source, guaranteeing that it will be of equal quality, the buyer may drop his order. He knows he can get what he wants from Great Britain, Sweden, the U. S., Czechoslovakia, Austria or Japan.

Throat Cutting—Exporters have been quick to capitalize on this impasse. They promise the prospective buyer they can get him exactly what he wants, providing the buyer agrees not to buy from the Schuman pool.

Ill-feeling between the pool and European importers is growing. Basis of conflict sometimes arises because Luxembourg office is trying to put itself in a better competitive position by bypassing the importer and dealing directly with the buyer.

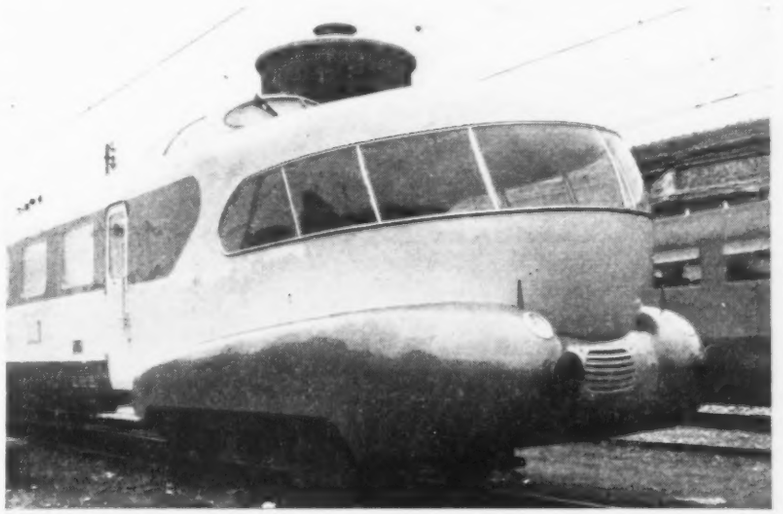
The Central Sales Office is now forced to place orders for certain steel products with customer selected producers contrary to pool principles. Alternative is to refuse to give in to customer demand for specific products. But this reduces business and hurts all the steel producers covered under the Schuman Plan.

Import Certificate—Since Oct. 20, foreign importers have had to certify to their governments that around 300 classifications of strategic American materials will not be transhipped or re-exported. American exporters are not allowed to ship steel scrap, alloy steel, machine tools and other heavy equipment, cast iron products, ferro-molybdenum, ferro-vanadium and other ferro-alloys until the U. S. Government has received the certificate from the importing country.

These certificates are, of course, necessary to limit round-about funneling of American materials to Iron Curtain countries. But, unfortunately these restrictions are backfiring on American trade.

Such certificates do not stop deals in free ports, but they have cut orders from foreign importers. The importer resents the delays forced by such restrictions and dislikes being held responsible to his government for what happens to the materials after he has sold them.

The result is increased importer interest in non-American products even when they cost more. Since these certificate restrictions are a part of our fight against communism there seems to be little that can be done about the situation.



NEW TRAIN: Italian railroads are testing this new electric train at Milan before putting it into service in the next few months. Train was built at the Breda plant. The train has a special emphasis on streamlined sleekness.

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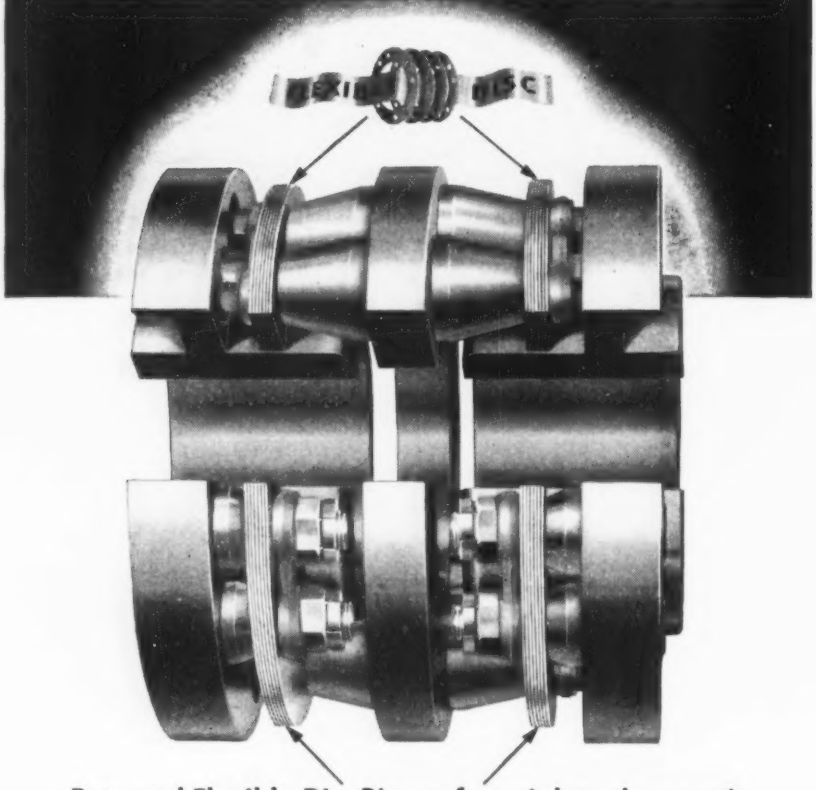

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INDIA:

Seeks loan to start 5-year plan of steel and industrial growth.

Government and industrial officials from India are now in the U. S. trying for an International Bank loan to aid their plans for a 5-year industrial expansion program. Included in the project is an increase in annual finished steel capacity from about 1 million to 2 million tons. Pig iron capacity would be increased to 800,000 tons.

For the immediate future $60 million will be needed. Part of this sum would come from the International Bank, part from Indian Iron & Steel Co., Bengal, and part from the Indian Government.

The Indians estimate that overall cost of the expansion in steel would be about $220 million. The new capacity would make India largely self-sufficient over the next 5 years but more expansion is contemplated to keep pace with industrial growth of the country.

Depending on delivery and price it is expected that some of the equipment for steel expansion would come from America. The Indians have been working closely with Koppers Co., Inc., in planning the growth program.

Steelmaking Now — Present capacity of India is divided among three companies: Tata Iron & Steel, southwest of Calcutta, 780,000 tons; Indian Iron & Steel Co., Bengal, 250,000 tons; and electric furnace capacity at Mysore, approximately 25,000 tons. This would be increased to 960,000 tons at Tata; 100,000 tons at Mysore. A proposed new plant, probably in the Hirakud district in central India, would have a finished steel capacity of 350,000 tons and pig iron capacity of 250,000 tons.

Finished steel products include plates, structurals, rails, sheets, bars, and rod. These would be expanded under the program to keep pace with expanding shipbuilding, locomotive, machine tool, textiles, and other steel-consuming industries.

The Indians have large reserves of iron ore of 65 pct Fe, plenty of metallurgical coal, and managanese.

STRIKE: Attrition—Not Negotiation

International Harvester strike at Chicago punctuated by violence . . . Ends after 88 days of attrition . . . Non-strikers bombed . . . Charge union man with murder—*By K. W. Bennett.*

After 88 days of violence, stormy picketing, and police action the strike at International Harvester's Chicago plants was settled early this week. It was a strike that was ended through attrition not negotiation, leaving an indelible imprint of ugly feeling between company and union. It will not soon be erased.

Sometimes even management's best intentions toward labor butt hard against a wall of demands so impossible to meet that they reflect a union's will to strike.

Into such unquiet circumstances went the International Harvester strike of Chicago. Scene of harsh management-labor clashes in the past, that city was shaken recently by two bombings. The victims were non-striking workers of International Harvester.

Violent Background — No one was hurt. But it was another episode in the violence concurrent with the strike. What had happened included bombings, paint bombings, assault, threatening phone calls, tire slashing.

On Sunday, Nov. 2, two bombs of identical manufacture were detonated at the homes of Harvester employees William Kilpatrick, 52, non-striker; and Frank Hrdina, 56, a non-striker. Police estimated total damage at $1200.

Chicago police promptly threw guard cordons around the homes of supervisory Harvester personnel, and at least 35 Harvester supervisors were given protection. Three men were seen to plant the first bomb.

On Sept. 14, Watson Wright, 51, non-striker, was attacked, slugged with a baseball bat that fractured his skull. He identified his attacker as Harold Ward, 30, secretary-treasurer of Local 108 of the Farm Equipment branch of the United Electrical Workers.

Murdered Worker — On Oct. 3, William Foster, 52, non-striker, was beaten to death with an iron pipe as he went to work. Chicago police, who had freed Ward, again seized him and charged him with Foster's murder. A "mystery" witness to the slaying was reported to be on tap. Union officials have indicated they will seek to force announcement of the witness' name prior to the trial.

HARVESTER
LAST YEAR
INVESTIGATE
GO INVESTIGATE MURDERS RACKETS CORRUPTION
CONG. VELDE — INT'L HARVESTER STRIKE-BREAKER
KEEP The TWINE MILL in CHICAGO
HELP BURY the Un American House UN AMERICAN Committee

REACTION: Placards of strikers, coffin show feeling against Congressional committee

The trouble began almost simultaneously with the strike, called Aug. 21. Eight of the ten I-H plants went out on demands for 15¢ an hr wage increase and a permanent allowance of a 21c an hr cost-of-living. The 22,500-member union listed its demands as nine. International Harvester said it totaled the union demands at 122.

In earlier stages of strike violence, the un-American Activities Committee happened on the scene. They asked Grant Oakes, secretary-treasurer of FE-UE District 11, whether he is or had ever been a Communist. Gerald Fielde, director of the National Harvester Conference Board of the FE-UE, and Dewitt Gilpin, international representative, District 11, FE-UE, were asked the same question. All three refused to answer on grounds that they might incriminate themselves

Racial Issue—Harvester sent all employees a letter listing the House Committee findings. Pickets took up a new tune and bore signs attacking the un-American Committee.

The union backed Ward to the hilt and referred to him as "a fighter for Negro rights." The racial issue, always present in the strike, was introduced actively. The fact that the witness who accused Ward of attacking him with a baseball bat was a Negro would seem to give the union contention a hollow ring. The murdered worker was also a Negro.

Harvester indicated before the strike ended that of the total strikers, 35 pct had returned.

Visits Poland — In *The Strike Call*, FE-UE publication distributed free to Harvester workers, the union pointed up Ward as a Negro leader. Sources with Harvester have indicated that Ward was a visitor to a Soviet-sponsored "Peace" conference in Poland last year.

STEEL PROFITS:

Second quarter income way off . . . Other large industry profits sag.

During the second quarter this year when most manufacturing industries were at least holding their own, the steel industry was taking a beating—both before and after taxes.

Industry profits after taxes for the second quarter declined 43 pct from the first period, according to a joint report by Federal Trade Commission and Securities & Exchange Commission.

First quarter profits after taxes were $193 million. This shrank to only $110 million in the second quarter.

Profits Plummet — Steel profit drop in the second quarter is even more sharply indicated in before tax figures. Profits before taxes for the second quarter amounted to $150 million as compared with $521 million for the first, down 71 pct.

Second quarter profit loss was not a general trend. Taking the manufacturing industries as a whole, out of the 23 classified in the government's tabulations, 14 showed increases in profits after taxes against nine declines. The overall level was little changed.

Fall Harder—It is significant, however, that the decline in profits hit large industries hardest including, in addition to steel, primary nonferrous metals and electrical machinery. Smaller industries generally had more profits after taxes; medium-sized industries showed little change.

Metal fabricators did a little better when compared with the first quarter. They came out with a 7 pct increase, retaining $128 million after taxes from a second quarter profit of $274 million. In the first quarter they kept $117 million out of $273 million.

In the metalworking field, the automotive industry had the greatest gain, showing a 22 pct increase. Profits before taxes amounted to $792 million, up $71 million for the quarter. After taxes, the figure was $262 million, an increase of $47 million.

OIL: Steel's Tight and Demand Potent

Chapman warns supply of aviation gas is short at petroleum convention . . . Expect more capacity for oil country goods to come in '53 . . . What may limit number of new wells drilled.

Supply of steel products for oil country use would continue tight while demand for petroleum products would stay potent, the 6347 oil men attending American Petroleum Institute's Chicago meeting were told last week.

Addressing the group, Secretary of Interior Chapman reported that aviation gasoline is still critically short. On the other hand civilian demand for petrol was beginning to level.

What contributes to aviation gas shortage is reluctance of petroleum crackers to erect alkylate plants, expensive even for oil men. What the industry fears is that rising use of jet fuels may make these plants obsolete in a few short years.

"Complacency"—Smugness that Russia's aggressive intentions are being restrained because the Reds have only one-eleventh the oil supply controlled by the U. S. could change to alarm in the event of any conflict, said Mr. Chapman. He was apparently referring to a possible swift Soviet march into the oil fields of the Near East. It seemed the U. S. was operating on a minimum strategic oil reserve.

In a commentary on availability of oil country goods and pipeline supply, R. C. Zell, Union Oil Co. of Los Angeles, said the eight companies producing oil country tubular goods have a maximum capacity of 1,850,000 annual tons.

Three mills, at least, are slated to bring in another 290,000 tons of capacity in 1953—and this should climb eventually to 660,000 tons.

More Later—Deducting the line pipe, mechanical pressure tubing, etc. that would also be rolled on the new mills, a minimum of 400,000 new tons of tubular oil country goods could be possible. This would be an overall total of 2,250,000 tons per year. However, new production from the expansion program will not be substantially felt until the fourth quarter of 1953.

Current scarcity of oil country goods, extending into 1953, will limit the number of wells drilled. Other factors hampering drilling are the increasing average depth of oil wells and widening of demand for heavy pipe weights and better steel grades.

It is true that the industry has pushed its total of drillings 10 pct ahead of the record 1951 figure in the first 6 months of '52. But the average well depth has been increasing more rapidly than expected. It could throw predictions for 1954 and 1955 well off the beam.

Below Goal—Petroleum Administration for Defense had earlier

Test Heat of Arata Iron

The first heat of 99.95 pct pure iron was poured last week in a test of Arata Metallurgy Co.'s direct electric furnace reduction process. The 2-ton heat, with others poured later in the week, will eventually go to Watertown Arsenal. The iron was made in an electric furnace by Ohio Steel Foundry Co., Lima, Ohio, for Arata under the supervision of Arata engineers.

Raw materials was magnetite ore. Analysis of the ingot was C 0.013, Mn 0.01, P 0.0008, S 0.08, Cr 0.01, Mo 0.006. There was no silicon. A carload of ore is expected to yield about 10 tons of ingots which will be rolled into sheet and tubing for further tests.

Possible uses are varied. Rotating bands for artillery shells have been made in Italy from tubing made by the Arata process. Other interest centers on the magnetic properties of the material. An Arata official asserts costs are comparable to electric furnace steel.

ON THE HOUSE: C. J. Fleisch, assistant general superintendent, Homestead Works, U. S. Steel, lights cigars for members of crew of a 45-in. slabbing mill who have just set a new production record.

this year set a target of 50,000 wells this year, with an increment increase of 5000 wells per year through 1955 (THE IRON AGE, July 17). When the steel strike began to be felt, it was augured that 1952 would be a 41,000 well year—well below the PAD estimate (THE IRON AGE, Aug. 7). Some support was hoped for in imports of foreign tubular goods, but this would be a wobbling reed since most foreign ores contain too much phosphorous to make rounds of tube-piercing quality. These foreign mills have a rated annual tube rolling capacity of 450,000 tons, but have never been able to attain that figure. Only 20 pct of European ores are useful in tubes.

Replacements? — About tanker capacity, convention attendees learned that capacity has increased along with petroleum production. In the last 10 years, employment of American tankers has increased about 62 pct. A considerable replacement problem was hinted. The age distribution of the fleet and obsolescence of war time construction were major factors.

Among the papers read, a discussion of microwave controlled pump stations indicated that there was considerable promise here.

Hydraulic Lathe Cuts Machining Time

Time savings of up to 75 pct are possible with a new hydraulic roll lathe developed by Lewis Foundry & Machine Div. of Blaw-Knox Co. First commercial unit incorporating hydraulic features was unveiled last week prior to shipment to Fairless Works of U. S. Steel Co.

Lewis built the 60-in. lathe for U. S. Steel after several years of testing with similar machines in its own roll-making shops. From its own experience the company reports that where substantial rough machining is required the hydraulic lathe has produced time savings up to 75 pct.

Hydraulic pressure is used to control the in-feed, lateral movement of tool, and movement of the tail stock. Other features include adjustable neck bearings.

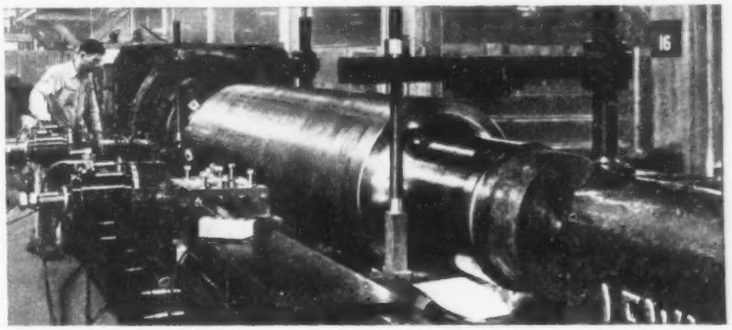
The U. S. Steel machine is powered by a 60-hp main drive motor with variable speed from 300 to 1200 rpm. A separate motor is used for the hydraulic pumps, which are designed to maintain a pressure of 1000 psi in each cylinder, about double the pressure of a manually-operated machine.

Other Features—Additional advantages claimed by Lewis for the machine are:

(1) Width of cut can be increased from a maximum of about 5 in. on manual roll lathes to as much as 8 in.; (2) in-feed or depth of cut can be increased to load limit of tool material used, since hydraulic pressure is predetermined and constant, eliminating wobble and shock; (3) cutting speed can be increased depending on tool material.

(4) Hydraulic pressure makes possible rough machining of hard surface rolls which cannot be machined on manual lathes, eliminating rough grinding; (5) several cutting tools may be operated simultaneously; (6) traverse carriage operates both from left to right, and right to left, yielding a saving in tool set-up time.

(7) Roll is supported on adjustable neck bearings, eliminating weight on the centers, reducing center wear and avoiding re-centering and need for excessive grinding or finishing to achieve trueness, and (8) hydraulic control of tail stock saves manual effort, reduces crane service, and contributes to safety, always an important factor in machine tool work.



HYDRAULIC ROLL LATHE: Closeup of 60-in. hydraulic roll lathe developed by Lewis Foundry & Machine Div. of Blaw-Knox Co. First commercial machine of its type, the lathe will be installed at U. S. Steel's Fairless Works.

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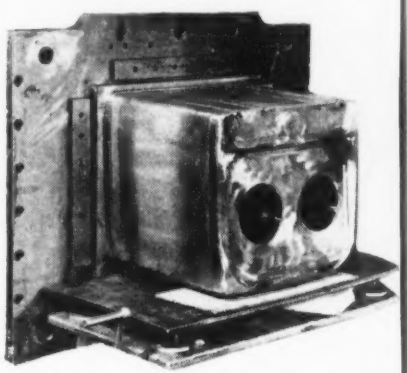
PLASTICS: Drive a

Molders use big presses, dies to hike output of TV cabinets . . . Eye appliance fields.

Plastics molders want to enlarge the wedge of their entrance into fields traditionally held by steel and wood. They are using bigger presses and dies to step up production of TV cabinets and to move into the appliance field. They



DIES: This set molds a 30-lb

are also appraising the chances of a deep plunge into the furniture market.

Four years ago Admiral Corp. adopted a 1-piece molded plastic cabinet and was able to cut the price of its 7-in. set by $100. Now Admiral is marketing 17-in. sets with plastic cabinets.

Latest success in the field is Servel's Wonderbar portable refrigerator which has a plastic housing, interior lining, door, etc. This item is selling far beyond Servel's coldest dreams. A new set of dies is now being made to complement the original set which cost $70,000. The Wonderbar, retailing for $149.50, weighs 40 lb.

Give the Facts—Plastics producers feel there are many manufacturers who don't have a knowledgeable grasp of plastics possibilities or even limitations.

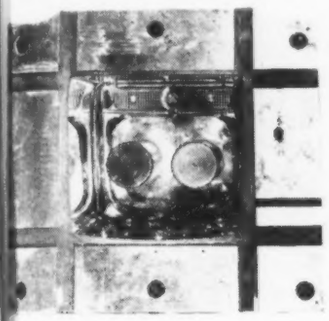
That's why men of the plastics industry met last week in New York. Five big-unit molders and seven materials suppliers set in motion an educational campaign

Deeper Wedge

on large moldings—6x3x3 ft is a reasonably practical size now.

A special committee was formed to nurture acceptance of large plastic moldings by designers and management officials of appliance and furniture firms. They will spread the facts on costs, color, performance, possibilities.

Plastics molders see growth opportunities as enormous. Back in



tic TV cabinet for Motorola.

1948 only 10,000 cabinets were molded. Today large cabinets are being molded at the rate of 160,000 per month.

Need More Shops—Yet only a few shops make the big dies needed for large plastic units. Plastics molders must contend with the job of spreading technical know-how. Making these large dies, some of which weigh up to 7 tons, requires very special engineering.

One appliance maker has $250,000 worth of dies in current production with a leading molder. Generally, the industry reports a slight delay in diemaking capacity.

The larger the plastic piece the larger the press needed to mold it. One big press can turn out four 30-lb plastic TV cabinets every 4 min, using modern materials handling methods. On the production line are presses of 500 ton capacity and more. Availability of larger presses will increase the size of plastic parts. Currently, delivery time on big presses is extended.

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MAGNESIUM: Stock Huge Surplus

Output more than doubles combined civilian, military use . . . National stockpile gets about 5000 tons monthly . . . Wide range of uses displayed at meeting—*By R. L. Hatschek.*

With production running at over 9000 tons monthly and combined military and civilian consumption averaging just shy of 4000 tons a month, the U. S. has magnesium coming out of its ears. But even this overflow is being taken care of—by the national stockpile.

Government agencies have urged manufacturers to use the very light metal in all possible applications, particularly in aircraft. Casting, forming and fabricating facilities are judged adequate to more than ample for present requirements. The light sheet picture has improved as a result of new rolling mill capacity (see THE IRON AGE, Sept. 4, p. 90).

Magnesium supplies have improved to the extent that fabricators have asked for this material to be lifted from Group II (in approximate balance) to Group III (in fair to good supply) in the government's list of basic materials.

Meeting with National Production Authority last week, the fabricators' industry advisory committee said that facilities now built or under construction will be sufficient to meet all foreseeable demands.

Even now, industry representatives said, some of their sheet and sand casting facilities are being only partly used. They added that the government should get more solidly behind designing which would require more use of magnesium fabricating facilities.

Capacity vs. Use—The 9000-ton monthly output figure breaks down to about 2000 tons produced by Dow Chemical Co., the only private producer, with the remainder coming from six government-owned plants. Civilian use totals approximately 1000 tons monthly, almost unchanged from the pre-Korea rate. Meanwhile, military consumption of magnesium has spurted in the past 2 years to about 3000 tons a month.

In view of ample supply, magnesium is considered "non-strategic." The ore, sea water from which it is extracted is limitless. A 5-ft-square tank 5 ft deep filled with sea water contains about 1 lb of the metal.

The industry is aggressively going after new and bigger markets. Last week the Magnesium Assn. held its eighth annual meeting in New York. As an indication of rising interest, registration hit a new record of 475, topping last year's 354 by a wide margin.

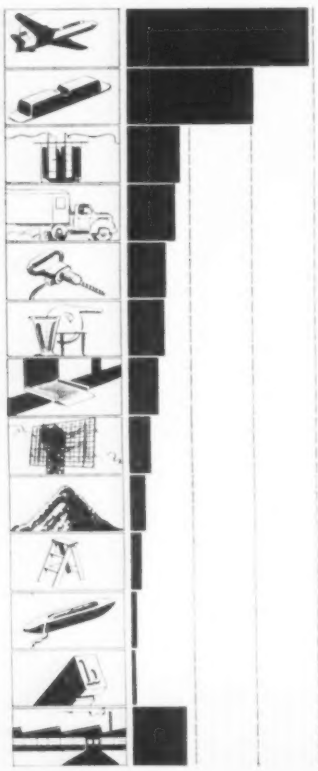
Products Displayed—A diversity of castings, forgings, rolled and extruded products were shown. Everything from rough parts to finished consumer goods was displayed. Basic theme was "Lift and Compare" products incorporating magnesium and those using other materials. Emphasis seemed to be on precision castings.

Technical discussions centered primarily about new developments in magnesium casting and service experience with the metal. Among other papers was a talk by Major C. J. P. Ball on magnesium progress in Britain. He disclosed that Magnesium Elektron, Ltd. had done extensive work with thorium—zinc—zirconium alloys of magnesium resulting in good creep resistance at elevated temperatures.

Big Show Coming—Announcement of an international magnesium exposition to be held Mar. 31 to Apr. 2 in Washington was made.

A new set of Magnesium Assn. officers was elected for 1953. They are: President, J. S. Kirkpatrick, Brooks & Perkins, Inc.; vice-president, W. C. Murray, Utica Radiator Corp.; and treasurer, R. D. Taylor, Federated Metals Div.

Distribution of Magnesium in 1951



Aircraft	29.3 pct.
Aluminum	20.4
Electrochemical	8.5
Automotive	7.6
Machinery & Tools	6.2
Chemical & Metallurgical	6.0
Materials Handling	4.7
Electrical	3.5
Magnesium Powder	2.4
Consumer Products	1.6
Textiles	0.8
Printing	0.4
Miscellaneous	8.6

Source: Magnesium Assn.

STEEL: Output Dashes Planners' Hopes

Quick rebound from strike undermines big arguments for retaining controls . . . Will try to sell Ike on keeping revised CMP . . . Stress war threats, value of materials reports.

Continued shrinking of the gap between steel output and demand is causing growing alarm on the part of Washington's "professional controllers."

Industry's fast rebound from the steel strike of last summer first planted the gnawing doubt in the Administration's thinking that metal scarcities could be used effectively as a control weapon for many months to come. As they saw it until recently, shortages of the "critical" variety would continue to plague both defense and civilian industries at least to July.

Sustained husky output (better than 100 pct of capacity since mid-August) is now fast undermining the planners' anticipated arguments for a year's extension (beyond next June 30) of the Controlled Materials Plan.

New line of thinking, scheduled for unveiling to President-elect Eisenhower's aides next week, is that complete decontrol of materials would be dangerous while there is a threat to world peace.

Reporting—A second reason for extension of some metal-control program is also being readied for presentation to the incoming Administration advisors. Pitch here is to be that both industry and government must unite to preserve the "reporting requirements" of CMP. Industrial reports on raw materials are of particular importance in guiding the course of national planning, it is contended.

Defense officials say the present system of quarterly reporting by materials users, in addition to the basic job of routing scarce metals into rearmament projects, affords needed answers to the questions of how and where certain items are used in industry.

Flow of this information into Washington should continue, it is argued by the bureaucrats, in order to enable the government to keep abreast of industry needs during coming "normal" production periods. Having this information always on hand on an up-to-date basis would permit a quick resumption of full-scale CMP.

Industry Controls This Week

Alloys—Amend. 27, GOR 9 lifts price controls on sales by producers of high temperature alloys.

Bolts, Nuts—SR 1, GOR 35 gives manufacturers of bolts, nuts, screws and rivets an option to use certain specified price increases.

Coke—Amend. 11, SR 13, GCPR extends by 15 days the time in which adjustable pricing provisions used by producers of byproduct oven coke and coal chemicals are applicable.

Controlled Materials—Amend. CMP Reg. 2 gives users of controlled materials the option of maintaining inventories on a class or item basis.

Forgings—CPR 179 establishes a new price ceiling method to cover sales by forgings producers.

Gas—Amend. 8, CPR 17 has been issued to prevent gas producers from increasing the level of price ceilings in a given area under the provisions of CPR 17. Interp. 1, SR 10, CPR 17 clarifies pricing provisions on gasolines, naphtha and other fuels.

Metal Tubes—CPR 178 sets new ceiling prices for sales of collapsible metal tubes. Charges for converting tin and lead into fabricated tubes are also included.

Railroad Equipment—Amend. NPA Order M-73 regulates maintenance, repair, installation and operating supplies for railroads.

Steel—Fourth quarter non-military orders, if placed with steel mills between Nov. 17 and Nov. 28, calling for February delivery are to be shipped ahead of first quarter orders with the same delivery date. This is authorized in an amendment to Dir. 6 to CMP Reg. 1.

STEEL: Output Hits High Gear

As Reported to the American Iron and Steel Institute

	Openhearth		Bessemer		Electric		Total			
1951	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Net Tons	Pct Cap.	Calculated Net Tons Weekly	No. Weeks in Month
January	7,846,657	101.4	431,725	90.4	570,084	88.8	8,848,466	99.9	1,997,396	4.43
February	6,936,993	99.3	326,112	75.6	507,302	87.5	7,770,407	97.2	1,942,602	4.00
March	8,061,346	104.2	408,926	85.6	606,358	94.5	9,076,630	102.5	2,048,901	4.43
1st Quarter	22,844,996	101.7	1,166,763	84.2	1,683,744	90.4	25,695,503	100.0	1,998,095	12.86
April	7,858,839	104.9	392,472	84.9	594,668	95.7	8,845,979	103.1	2,062,000	4.29
May	8,072,994	104.4	408,650	85.6	618,511	96.4	9,100,155	102.8	2,054,211	4.43
June	7,669,449	102.4	403,001	87.1	589,898	94.9	8,662,348	101.0	2,019,195	4.29
2nd Quarter	23,601,282	103.9	1,204,123	85.9	1,803,077	95.7	26,608,482	102.3	2,045,233	13.01
1st 6 months	46,446,278	102.8	2,370,886	85.0	3,486,821	93.0	52,303,985	101.1	2,021,801	25.87
July	7,706,078	99.8	411,599	86.4	566,818	88.5	8,684,495	98.3	1,964,818	4.42
August	7,694,965	99.5	436,822	91.5	607,308	94.6	8,739,095	98.7	1,972,708	4.43
September	7,653,801	102.4	404,726	87.7	601,830	97.0	8,660,357	101.2	2,023,448	4.28
3rd Quarter	23,054,844	100.5	1,253,147	88.5	1,775,956	93.4	26,083,947	99.4	1,986,592	13.13
9 months	69,501,122	102.0	3,624,033	86.2	5,262,777	93.1	78,387,932	100.5	2,009,947	39.00
October	8,028,721	103.8	458,128	95.9	635,037	98.9	9,121,886	103.0	2,059,118	4.43
November	7,750,845	103.5	411,954	89.1	636,553	102.4	8,799,352	102.8	2,051,131	4.29
December	7,885,830	102.2	396,831	83.3	608,017	94.9	8,890,678	100.6	2,011,466	4.42
4th Quarter	23,665,396	103.1	1,266,913	89.4	1,879,607	98.7	26,811,916	102.1	2,040,481	13.14
2nd 6 months	46,720,240	101.8	2,520,060	89.0	3,655,563	96.0	52,895,863	100.7	2,013,546	26.27
Total	93,166,518	102.3	4,890,946	87.0	7,142,384	94.5	105,199,848	100.9	2,017,642	52.14
1952										
January	8,103,123	100.7	407,298	89.3	625,696	89.7	9,136,117	99.3	2,062,329	4.43
February	7,703,066	102.4	382,712	89.8	571,432	87.6	8,657,210	100.7	2,091,114	4.14
March	8,401,140	104.4	378,861	83.1	624,190	89.5	9,404,191	102.2	2,122,842	4.43
1st Quarter	24,207,329	102.5	1,168,871	87.4	1,821,318	89.0	27,197,518	100.7	2,092,117	13.00
April	7,101,199	91.1	323,006	73.2	566,937	83.9	7,991,142	89.7	1,862,737	4.29
May	7,291,865	90.6	318,642	69.9	594,089	85.2	8,204,596	89.2	1,852,053	4.43
June	1,446,927	18.6	22,862	5.2	169,702	25.1	1,639,491	18.4	382,168	4.29
2nd Quarter	15,839,991	67.0	664,510	49.6	1,330,728	65.0	17,835,229	66.0	1,370,886	13.01
1st 6 months	40,047,320	84.8	1,833,381	68.5	3,152,046	77.0	45,032,747	83.4	1,731,363	26.01
July	1,347,587	16.8	2,000	0.4	277,371	39.8	1,626,958	17.7	368,090	4.42
August	7,599,888	94.4	309,361	67.8	589,438	84.5	8,498,687	92.4	1,918,440	4.43
September[1]	8,039,128	103.4	351,620	79.8	671,357	99.6	9,062,105	101.9	2,117,314	4.28
3rd Quarter[1]	16,986,603	71.2	662,981	49.1	1,538,166	74.4	19,187,750	70.4	1,461,387	13.13
9 months[1]	57,033,923	80.2	2,496,362	62.0	4,690,212	76.1	64,220,497	79.0	1,640,789	39.14
October[2]	8,741,000	108.6	347,000	76.1	702,000	100.6	9,790,000	106.4	2,210,000	4.43

Note—Percentages of capacity operated in 1951 are calculated on weekly capacities of 1,748,337 net tons openhearth, 107,806 net tons bessemer and 144,891 net tons electric ingots and steel for castings, total 1,999,034 net tons; based on annual capacities as of Jan. 1, 1951 as follows: Openhearth 91,054,020 net tons, bessemer 5,621,000 net tons; electric 7,554,630 net tons, total 104,229,650 net tons. Percentages for 1952 are calculated on weekly capacities of 1,816,637 net tons openhearth, 102,926 net tons bessemer and 157,477 net tons electric ingots and steel for castings, total 2,077,040 net tons; based on annual capacities as of Jan. 1, 1952 as follows: Openhearth 94,973,780 net tons, bessemer 5,381,000 net tons, electric 8,232,890 net tons, total 108,587,670 net tons.

[1] Revised. [2] Preliminary figures subject to revision.

PROCUREMENT: Air Force Takes Most

Flying arm spent half of total military expenditures in period from July 1 to Sept. 30 . . . Army obligated $3.9 billion, Navy $2 billion . . . Total Defense Dept. sum was $11.8 billion.

Air Force buying of major equipment and supplies, plus amounts invested in military building and plant expansion, continues to outdistance Army and Navy programs in the same field, latest Defense Dept. figures show.

Between July 1 and Sept. 30 the military services obligated $11.8 billion for the programs named. Half of this total, or $5.9 billion, represented Air Force obligations. Amounts for the Army and Navy, respectively, were $3.9 billion and $2 billion.

Ships, planes, tanks, guns, and related military hardware called for obligations of $10.2 billion. Clothing, food and fuel obligations took $1 billion, and construction $600 million.

Military Assistance — Of the $10.2 billion obligated for fighting goods, $201 million was earmarked for the military assistance program. Funds for military assistance allocated to Defense Dept. by the Director of Mutual Security totaled $1.1 billion in the first quarter of this fiscal year.

All obligations for the 27 months ended Sept. 30 reached $128.3 billion, including $92.4 billion for buying and building. During this period, comparison of procurement and construction programs for the three services showed the following: Air Force, $36.1 billion; Army, $34.1 billion; and Navy, $22.2 billion.

Contracts Reported Last Week

Including description, quantity, dollar values, contractor and address. Italics indicate small business representatives.

Safe, field, 765 ea, $49,303, Herring-Hill-Marvin Safe Co., Hamilton, Ohio.
Chair, typewriter, 2080 ea, $30,420, Riteform Chair Co., St. Paul.
Chair, office, 2389 ea, $39,359, American Fixture & Mfg. Co., St. Louis.
Section, furniture, 978 ea, $215,184, Crown Office Supply Co., Chicago.
Fire fighting equipt sets, 250, $698,786, Fire Master Corp., Mt. Clemons, Mich.
Shop, motorized, 110, $4,950,660, Couse Mfg. Inc., Newark.
Repair parts for diesel engines, 5072, $35,199, Norberg Mfg. Co., St. Louis.
Repair parts for turbines, 2433, $108,190, The Falk Corp., Milwaukee.
Repair parts for pumps, 1904, $26,954, Goulds Pumps, Inc., Seneca Falls, N. Y.
Electric motors and repair parts, 1378, $48,973, Miehle Printing Press & Mfg. Co., Bloomfield, N. J.
Repair parts for pumps and compressors, 9380, $190,643, Worthington Corp., Harrison, N. J.
Repair parts for diesel engines, 6309, $63,773, Baldwin-Lima-Hamilton Corp., Hamilton, Ohio. *J. H. Niehaus.*
Dummy nose plugs, 88000 ea, $84,744, Townsend Mfg. and Tool Corp., Ithaca, N. Y.
Trucks, heavy duty with spare parts, 123, $1,264,431, Lull Mfg. Co., Minneapolis.
Vises, bench, 1000, $121,200, Birtman Electric Co., Rock Island, Ill.
Torches, blow, 5850, $29,016, Graybar Electric Co., Inc., Washington.
Handles, socket wrench, 40850, $42,861, The Wright Tool & Forge Co., Barberton, Ohio.
Handles, 62200, $26,439, The Bingham-Herbrand Corp., Fremont, Ohio.
Handles,socket wrench, 47450, $96,959, Snap-on Tools Corp., Kenosha, Wis.
Wrenches, var, 179800, $169,568, Plomb Tool Co., Los Angeles.
Hoists, 60, $34,728, Ingersoll-Rand Co., N. W. Washington.
Repair parts for hoisting equipt, 45, $27,-203, Otis Elevator Co., New York.
Repair parts for electrical communication equipt, Western Electric Co., Inc., New York.
Electric motors & repair parts for electric control equipt, 2195, $64,721, General Electric Co., Philadelphia.
Repair parts for diesel engines, 306037, $215,033, General Motors Corp., Detroit, *J. E. McKenna.*
Repair parts for pumps, 1878, $76,504, Buffalo Pumps, Inc., Buffalo.
Repair parts for pumps, 7130, $66,939, Worthington Corp., Harrison, N. J.
Repair parts for diesel engines, 6945, $74,558, National Supply Co., Springfield, Ohio.
Cone drive gear assys and repair parts, 146, $44,282, Michigan Tool Co., Detroit.
Nut, self locking, 2000000 ea, $34,274, Greer Stop Nut Co., Chicago.
Heater equipt for var aircraft, var, $34,-882, Stewart-Warner Corp., Indianapolis, *A. N. Phillips.*
Nuts, self locking, 3000000 ea, $61,302, Elastic Stop Nut Corp., Union, N. J.
Windshield deicing pump, 955 ea, $126,-632, Eastern Industries Inc., New Haven, Conn.
Plug, coaxial, 40360 ea, $45,526, Kings Electronics Co. Inc., Westchester, N. Y.
11 items of maintenance parts for aircraft, var, $29,600, Lord Mfg. Co., Erie, Pa.
Platform aircraft servicing, 64 ea, $32,-013, Weber Aircraft Corp., Burbank, Calif.
Hydraulic control valve, 60 ea, $41,322, Wm. R. Whitaker Co., Los Angeles.
Modification kits, 34 ea, $42,832, Philco Corp., Philadelphia.

Government Inviting Bids

Latest proposed Federal procurements, listed by item, quantity, invitation No. or proposal and opening date. (Invitations for Bid numbers are followed by "B," requests for proposals or quotations by "Q.")

Rock Island Arsenal, Rock Island, Ill.
Pintle cradle assys, 8500 ea, 11-070-53-260B, Nov. 26.
Pintle, 6000 ea, 11-070-52-260B, Nov. 26.
Key knob elevating, 10000 ea, 11-070-53-260B, Nov. 26.
Bracket, 800 ea, 11-070-53-269B, Nov. 18.
Plate, side, left assy, 20000 ea, 11-070-53-277B, Dec. 3.
Plate, side right assy, 1500 ea, 11-070-53-277B, Dec. 3.

Corps of Engineers, Pittsburgh.
Valve, iron cast, 21,078 ea, Eng 36-058-53-38B, Nov. 17.

Bureau of Ships, Washington.
Coils, chilled water cooling, 1034, 549-476Q, Nov. 28.
Coils, gravity, var sizes, 316, 549-476Q, Nov. 28.
Unit cooler, chilled water, 674, 549-376Q, Nov. 28.
Outboard engine, 117, 543-161Q, Nov. 28.

Navy Purchasing Office, Washington.
Guns, spray, paint, 300, 6809B, Nov. 25.
Lifters, valve spring, 7645, 1001Q, Nov. 28.
Light, flashing buoy, 240, 6158S, Dec. 3.
Plugs, tracer hole, 750000, 6810-OB, Dec. 9.
Tracer, adapter, projectite, 200000, 6801-OB, Dec. 3.

Navy Purchasing Office, New York.
Conduit fittings, 294200 ea, 1143B, Nov. 28.
Lockers, metal, 1275, 1148B, Nov. 17.
Refrigerators, 30 ea, 1151B, Nov. 17.

Yards and Docks Supply Officer, Porthueneme, Calif.
Repair parts for Clark Equipt, 158 itm, 1452/53B, Dec. 1.
Repair parts for Timken-Detroit axle equipt, 89 itm, 1464/53B, Dec. 5.
Repair parts for S. K. Wellman, 33 itm, 1456/53Q, Nov. 17.
Repair parts for Waukesha motors equipt, 104 itm, 529-1/53Q, Nov. 29.
Repair parts for Hercules Motor Corp., 119 itm, 508-1/53Q, Nov. 18.
Repair parts for Wagner electric equipt, 58 itm, 529-1/53Q, Nov. 28.

Watervliet Arsenal, Watervliet, N. Y.
Alloy steel breechblock, parts for 57 MM rifle, 2000, 53-45B, Dec. 4.
Steel extractor, special artillery tools, 200 to 1400 ea, 53-48B, Dec. 3.

General Stores Supply Office, Philadelphia.
Brush boiler, 8080 ea, 1-1212B, Nov. 25.
Cleaning outfits boiler tube, 305 ea, 1-1212B, Nov. 25.

Submarine Supply Office, Philadelphia.
Wrenches, var types, 910 ea, 1-884Q, Nov. 27.
Catch and lock assy, 2615 ea, 4-1032Q, Nov. 28.

Aviation Supply Office, Philadelphia.
Shackles anchor screw pin, 93200 ea, K54433B, Nov. 24.

Corps of Engineers, Chicago.
Pan, pneu float, 4581 ea, B-136B, Nov. 28.

Ordnance Tank Automotive Center, Detroit.
Terminal, 817,000, 53-526B, Dec. 5.
Adapter stand engine, 300, 53-525B, Dec. 8.
Arbor idler shaft trans case, 100, 53-525B, Dec. 8.
Bearing bush type shackle, 40000, 53-504B, Dec. 8.

Construction

Steel Inquiries and Awards

Fabricated steel inquiries this week include the following:

1236 **Tons,** Chester County, Pa., divided highway, 4 plate girder bridges, 1 I-beam bridge, 3 reinforced concrete bridges, service roads, ramps, and grading. Pennsylvania Dept. of Highways, Harrisburg, Pa. Bids to Dec. 19, 1952.

340 **Tons,** Simsbury, Conn., steel truss bridge and approaches, reinforced concrete box culverts and approaches of bituminous macadam. E. B. Burdick, Hartford, Conn., district engineer.

Reinforcing bar inquiries this week include the following:

299 **Tons,** Chester County, Pa., divided highway, 4 plate girder bridges, 1 I-beam bridge, 3 reinforced concrete bridges, service roads, ramps, and grading. Pennsylvania Dept. of Highways, Harrisburg, Pa. Bids to Dec. 19, 1952.

109 **Tons,** Simsbury, Conn., steel truss bridge and approaches, reinforced concrete box culverts and approaches of bituminous macadam. E. B. Burdick, Hartford, Conn., district engineer.

The U. S. Steel Supply team that gives you

personalized service

Our "speed specialist" keeps your order on the move!

OUR traffic manager hates to hold your order in our warehouse. As soon as it is an order—for steel, tools, equipment or machinery—he gets it out of our warehouse and into your plant as fast as possible. For local delivery, he dispatches a fleet of specialized trucks and a crew of competent drivers who are proud of their record for quick, dependable service.

If you specify delivery or routing instructions on out-of-town shipments, our traffic manager will see that they are followed exactly. If you leave the routing up to him, he will schedule delivery so as to give you the best possible protection in the matters of both cost and service. He studies the special unloading requirements of each of our customers, and ships accordingly.

When special conditions—speed, convenience or any other—should be observed in the delivery of your order, you can get the *personal* attention of our traffic manager through your U. S. Steel Supply salesman or telephone salesman.

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U.S. STEEL SUPPLY

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UNITED STATES STEEL

HAVE YOU SEEN THIS NEW BOOKLET?

IT TELLS HOW TO DO THE HARD JOBS

Better cleaning cuts costs in aircraft production. This 48-page illustrated booklet outlines all the big cleaning jobs. Have you seen the latest Oakite recommendations on:

- How to clean aluminum in preparation for anodizing? *See page 4.*
- How to prepare aluminum for spot welding? *See page 10.*
- How to prepare aluminum for painting? *See page 15.*
- How to clean aluminum before and after heat treating? *See page 20.*
- How to strip paint from aluminum? *See page 22.*
- How to clean magnesium? *See page 27.*
- How to select and install cleaning tanks, rinse tanks, and spray-washing machines? *See pages 31 to 35.*
- How to treat water in paint spray booths? *See page 36.*
- How to clean engine test cells? *See page 40.*

FREE For a copy of *"How to clean metals in aircraft production"* write Oakite Products, Inc., 30H Thames St., New York 6, N. Y.

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Industrial Briefs

New Machine — TUBE REDUCING CORP., at the request of the Navy, has designed and is building a new machine to cold reduce tubing up to 18 in. in diam, about three times as large as the previous maximum size.

International Division Formed — ARTHUR D. LITTLE INC. has established an International Div. to meet the increasing demand for its services in international areas. A. G. Haldane will head the division.

Moved—RELIANCE ELECTRIC & ENGINEERING CO. has moved its Newark, N. J., sales office to 535 High Street.

Opening—TEXAS GAS TRANSMISSION CORP. has opened an office in the Melrose Bldg., Houston.

New Dealer—CLARK EQUIPMENT CO., Battle Creek, Mich., has appointed Hull Equipment Co., of Union, N. J., its new dealer in northern New Jersey for materials handling products.

New Canadian Subsidiary — CHIKSAN CO. has established a wholly-owned Canadian subsidiary which will operate under the name of Chiksan of Canada Ltd.

Slight Increase — Deliveries of new domestic freight cars have risen to 7437 for the month of October due to a slight increase in the amount of steel available for the month's production, according to AMERICAN RAILWAY CAR INSTITUTE and Assn. of American Railroads.

Announced — MICHAEL SCHIAVONE & SONS INC. has announced that the Stanley B. Amidon Div. of the company will be located in new offices at 100 W. Boylston St., Worcester.

Sales Up—SYLVANIA ELECTRIC PRODUCTS INC. reported that net sales for the third quarter of 1952 were 43 pct above those of the same period in 1951, and net income was 47 pct higher.

Congratulations — FRICK CO., Waynesboro, Pa., is celebrating a century of engineering service this year.

Operation—Twenty-nine new coke ovens were put into operation today at the Midland Works of CRUCIBLE STEEL CO. OF AMERICA.

Will Design—FREDERIC R. HARRIS INC. has been engaged by the New Jersey Highway Authority to design and supervise construction of a $4-million section of the Garden State Parkway.

Elected—Professor E. C. Thompson, Professor of Metallurgy, University of Manchester, has been elected president of the INSTITUTE OF METALS.

Expanding — LEWIS-SHEPARD, Watertown, Mass., is increasing by 50 pct its tool room and machine shop capacities. This additional construction is now in the final stages of completion.

Appointed — CERIUM METALS CORP. has appointed Ohio Ferro-Alloys Corp., Canton, Ohio, as its exclusive sales representative to the iron and steel industry.

Cited — STEEL FOUNDERS' SOCIETY OF AMERICA has been cited for national recognition as winner of the 1952 Award of Merit conferred by American Trade Assn. Executives for distinguished service by a national association.

Cash Awards—GENERAL MOTORS CORP. has offered $194,000 in cash awards for the best ideas to get America's highway and traffic system "out of the muddle."

Launched—INGALLS SHIPBUILDING CORP., Birmingham, has launched the first of 5 large new type LSTs it has built at its Pascagoula, Miss., shipyard.

Anniversary — ELIZABETH IRON WORKS celebrated its 45th anniversary recently at its Green Lane Plant in Union, N. J. More than 400 nationally known business executives from the building, construction and steel industries attended.

New Factory—SOUTHWEST PRODUCTS CO. will move into its new factory at 1705 So. Montain Ave., Duarte, Calif., in January.

Purchased Property—ADAMAS CARBIDE CORP., Harrison, N. J., has purchased a 4½-acre tract from the Town of Kenilworth, N. J., and private individuals, where it will construct a 20,000-sq-ft plant.

In the foreground, Heat Treating Bay with Cranes 100 feet above floor level; Vertical Heat Treating Furnaces and Quenching Tanks 83 feet deep.

esta equipment is pro-ced from raw materials finished product in this it plant, the largest of kind in the world.

Designers and Builders of Complete Steel Plants

MESTA MACHINE COMPANY

PITTSBURGH, PENNSYLVANIA

HP Race Has Good and Bad Sides

Some claim high-powered cars are too dangerous . . . Others point to higher efficiency, longer life, better economy . . . Drivers determine highway safety—By *R. D. Raddant.*

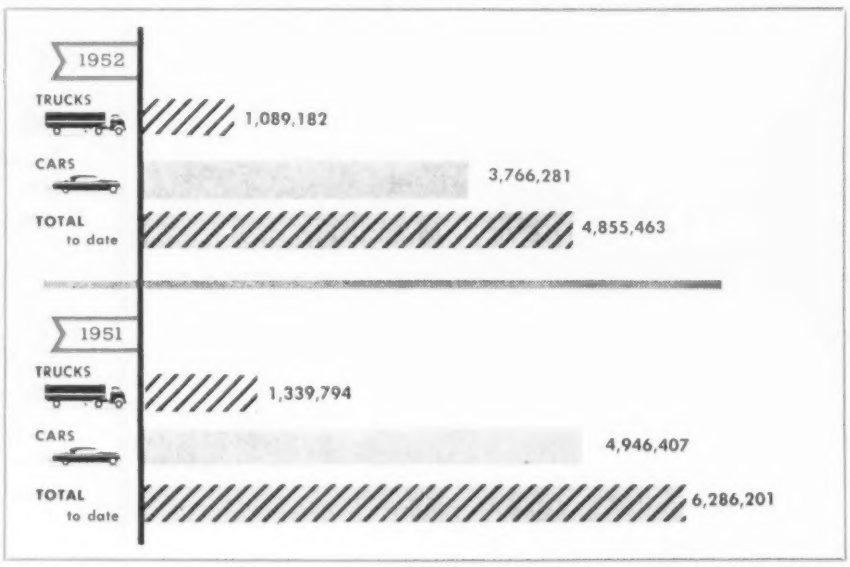
Have the automobile manufacturers turned loose a monster in the horsepower race that is sweeping the industry?

Makers of the more powerful new cars insist they have not. They keep on trying for more push in their new V-8 engines. At the same time, critics claim that the added power is placing dangerous machines, too fast and powerful to control, on our highways. Sounds are heard of legislation to put a crimp on engine power.

As usual, the real answer lies somewhere between the two extremes. There is more than a little truth to the contention that the real hp race exists only in the minds of the advertising and sales departments. It is claimed there is no real hp race, but a performance contest.

The term horsepower is in itself misleading. There is no uniform set of standards for measurement in the auto industry. Big difference is whether hp is measured at the end of the transmission or before any load is placed on the engine. Conditions also vary. They don't talk about it publicly, but a lot of resentment exists over hp claims between several companies.

Here is how the hp derby will line up in 1953: unofficially, Cadillac, 200 plus hp; Lincoln, 205 hp; Buick, about 190 hp; Chrysler, 180 hp; Packard, 180 hp.



What it Means—Increased hp does not automatically mean increased speed. While hp has increased considerably in the past decade, rated speed is little higher. It takes more power to efficiently operate a large car with automatic transmission and other power-consuming devices.

A lot of the fanfare that has led to the term "hp race" is the child of the advertising and sales end of the business. Engineers would prefer to talk about torque, reduced axle ratios and efficiency per ton-mile rather than just speed and power.

There are signs that indicate automakers realize they may have stepped a little too far in stressing power and speed. But the unfortunate aspect is that the large bulk of the buying public measures engine performance by only hp and mph. Accepting this, advertising and promotion have stressed those points.

Actually, high hp is not historically new. Luxury car buyers in 1929 could drive a 265 hp Dusenberg. A Marmon 16-cylinder car was rated at 200 hp in 1931. A 1936 Packard 12-cylinder car had about 175 hp. So any criticism of the hp race should not be pointed altogether at present cars.

Definition—One of the primary motivations of the hp climb is to improve torque. Horsepower is the product of torque and speed. An engine designed to develop a high torque at high speed must also develop a high hp.

Torque, a force applied with leverage, is best translated in automotive terms as acceleration available at a given speed. To have good response at high speeds, a high torque, and a high hp, is necessary.

In lower hp cars, engineers are now placing more emphasis on improving torque than in boosting hp. This not only leads to better performance, but more miles per dollar. Some engineers believe that the hp trend depends chiefly on whether or not the quest for better acceleration at high cruising speeds continues.

Probably the biggest benefit of high hp is in the reduction of rear axle gear ratio. This has dropped from about 4.5 in 1930 to about 3.3 in some of the 1953 models. One car still under wraps is said to have dropped to a ratio just over 3.00.

What does this mean? It means that as the rear axle ratio decreases, the revolutions of the engine to reach a given speed are comparably lowered. The result is less wear on the engine, less necessary lubrication, less fuel consumption. Ability to reduce the axle ratio may well be the biggest contribution of higher hp.

The conclusion is that the hp race

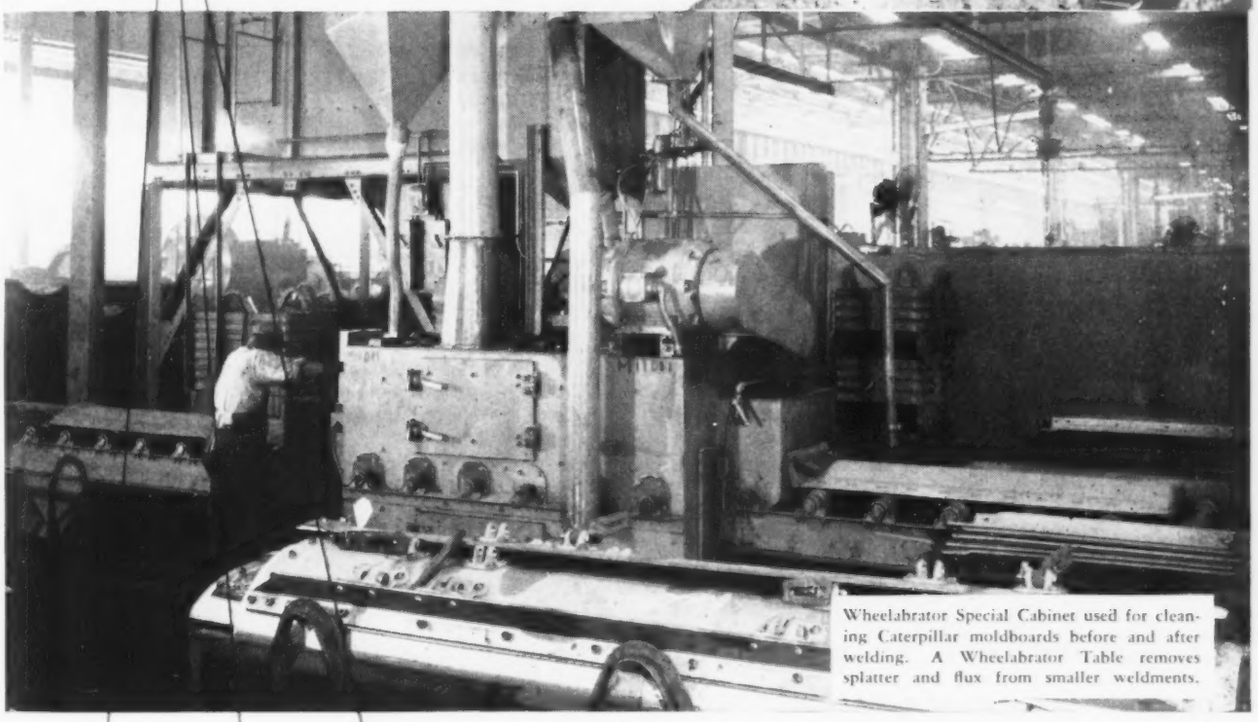
CATERPILLAR TRACTOR CO.

finds WHEELABRATOR®

AIRLESS BLAST CLEANING

invaluable

in building giant earthmovers



Wheelabrator Special Cabinet used for cleaning Caterpillar moldboards before and after welding. A Wheelabrator Table removes splatter and flux from smaller weldments.

1 Provides a thoroughly clean surface for welding

2 Eliminates costly grinding, buffing and polishing.

3 Earth scours readily over a Wheelabrated surface.

In building equipment like the giant Caterpillar earthmovers, welds that will take terrific punishment are a requisite. To obtain these tight welds, a thoroughly cleaned surface is of prime importance.

Wheelabrator airless blast cleaning not only provides this welding surface but its rapid, thorough cleaning action gives Caterpillar additional benefits like these: Welding flux and splatter are uniformly removed from weldments of all sizes and types. Costly manual grinding, buffing and polishing operations were eliminated when it was discovered that earth would scour more readily across the face of the Wheelabrated scraper blades and moldboards. Castings and heat treated parts are cleaned at low cost at production line speeds.

For your metal cleaning and finishing requirements, investigate the Wheelabrator. Write today for full details.

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WORLD'S LARGEST BUILDERS OF AIRLESS BLAST CLEANING EQUIPMENT

Magic Chef PROVES . . .

"It's no trick at all"

. . . to find New Savings with **SPEED NUTS!**

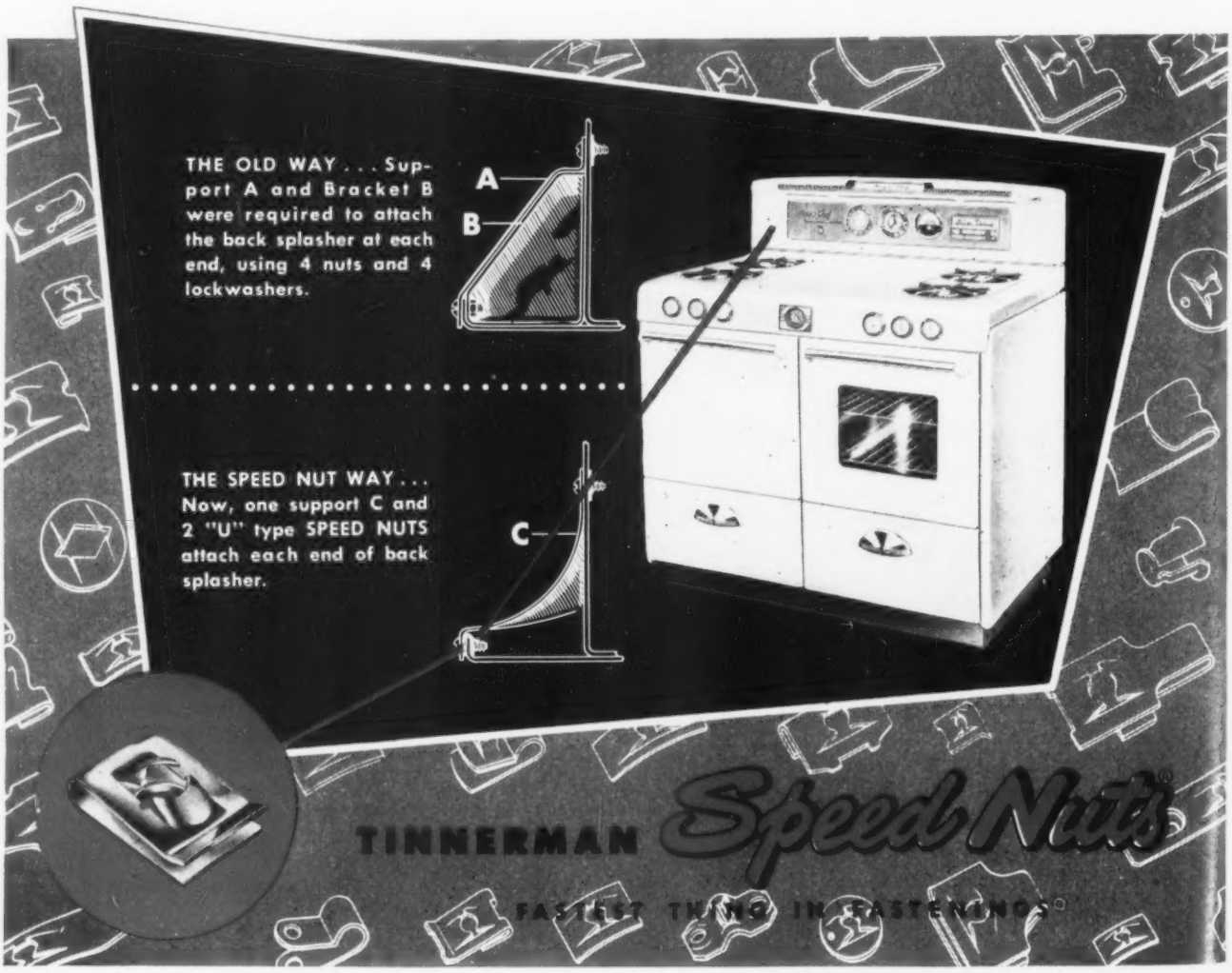
Magic Chef, Incorporated, St. Louis, Missouri, veteran user of SPEED NUTS, adds still another Savings Story to a long list!

Magic Chef engineers and designers have come to rely on assembly and material savings through the use of Tinnerman SPEED NUTS. That's why they again turned to Tinnerman when looking for better fastening methods for the back splasher assembly on a new line of ranges. The result—a neat 22% savings—sold them more than ever on the SPEED NUT economy factor.

Formerly, the back splasher was held in place with two-piece support brackets, threaded nuts and lockwashers. Now, the SPEED NUT WAY, simplified one-piece brackets and "U" type SPEED NUTS do the job better, faster and at less cost! "U" type SPEED NUTS are self-retaining, one-piece, self-locking fasteners that snap quickly and easily in place on the panel in screw-receiving position. They tighten down without being held...eliminate lockwashers .. reduce materials handling to a minimum.

No matter what you manufacture, turn to Tinnerman for fastening efficiency and economy. The Tinnerman representative in your area is ready to assist you. Call him in, he can arrange a FREE FASTENING ANALYSIS of your product to iron out your fastening problems. Contact him today! Or write direct to Tinnerman Products, Inc., Dept. 12, Box 6688, Cleveland 1, Ohio.

In Canada Dominion Fasteners Ltd., Hamilton, Ontario. *In Great Britain*, Simmonds Aerocessories, Ltd., Treforest, Wales. *In France* Aerocessoires Simmonds, S.A.—7 rue Henry Barbusse, Levallois (Seine.)


THE OLD WAY . . . Support A and Bracket B were required to attach the back splasher at each end, using 4 nuts and 4 lockwashers.
A
B
THE SPEED NUT WAY . . . Now, one support C and 2 "U" type SPEED NUTS attach each end of back splasher.
C
TINNERMAN
Speed Nuts®

n itself is resulting in better en- ine performance, increased miles er dollar, and longer wear.

However, it is strictly up to the river whether he uses the advantages or abuses them. It is in the buse that the danger lies.

Make Their Own—A behind-the-scenes story of mechanical ingenuity plus unprecedented cooperation of toolmakers unfolded last week at the Dodge Main plant.

There, the new V-8 engines powering the 1953 Dodge are rolling off a fully automated engine line. The distinctive factor is that at least 15 major tools were constructed by Dodge when toolmakers were unable to deliver.

The tool companies were not delinquent. Defense orders simply swamped facilities. Without the necessary priorities, auto orders were just out of luck. Desperate measures were necessary if the new Dodge engine was to make its appearance this year. That it did at all is a tribute to the ingenuity of staff mechanics and production men.

The key to the line lay in three large broaches ordered from the Cincinnati Milling Machine Co. Together they were to mill the cylinder block in the new engine.

Let Us Do It—Stymied by the tool bottleneck, Dodge mechanics approached the tool company with what amounted to this proposition: Let them turn over specifications, drawings and give Dodge a crack at it. This was done and results were amazing.

In 7 months, by using some of their own facilities, outside machine shops and parts manufacturers, Dodge had assembled the three broaches. As a single machine, the combined broaches stretch 159 ft and weigh 225 tons.

Altogether it includes an automatic loader, transfer and 180° turning machines, and 113 tungsten-carbide planer-type tool inserts to machine the cylinder block. At maximum speed, the block moves through the broach at 200 fpm.

Similar improvisation occurred elsewhere in the line. Near-obsolete machines were brought in from other plants to fill gaps left by other undelivered tools. These are now being rapidly replaced with the delivery of new tools.

J. J. Wetzel, Dodge master mechanic, O. W. Franke, operating manager, and M. C. Patterson, general works manager, were the men instrumental in getting the line working on time. Much credit should also go to the tool companies which cooperated not only with prints and drawings but with technical advice.

There is no intention of Dodge going into the tool business. Amazing as results were, they were not economically sound when compared with a normal procedure.

Automotive Production

(U. S. and Canada Combined)

WEEK ENDING	CARS	TRUCKS	TOTAL
Nov. 15, 1952	114,637*	32,876*	147,513*
Nov. 8, 1952	111,845	31,765	143,610
Nov. 7, 1951	93,744	26,993	120,737
Nov. 1, 1951	90,572	26,770	117,342

*Estimated

Source: *Ward's Reports*

Public Jumps at Power Steering

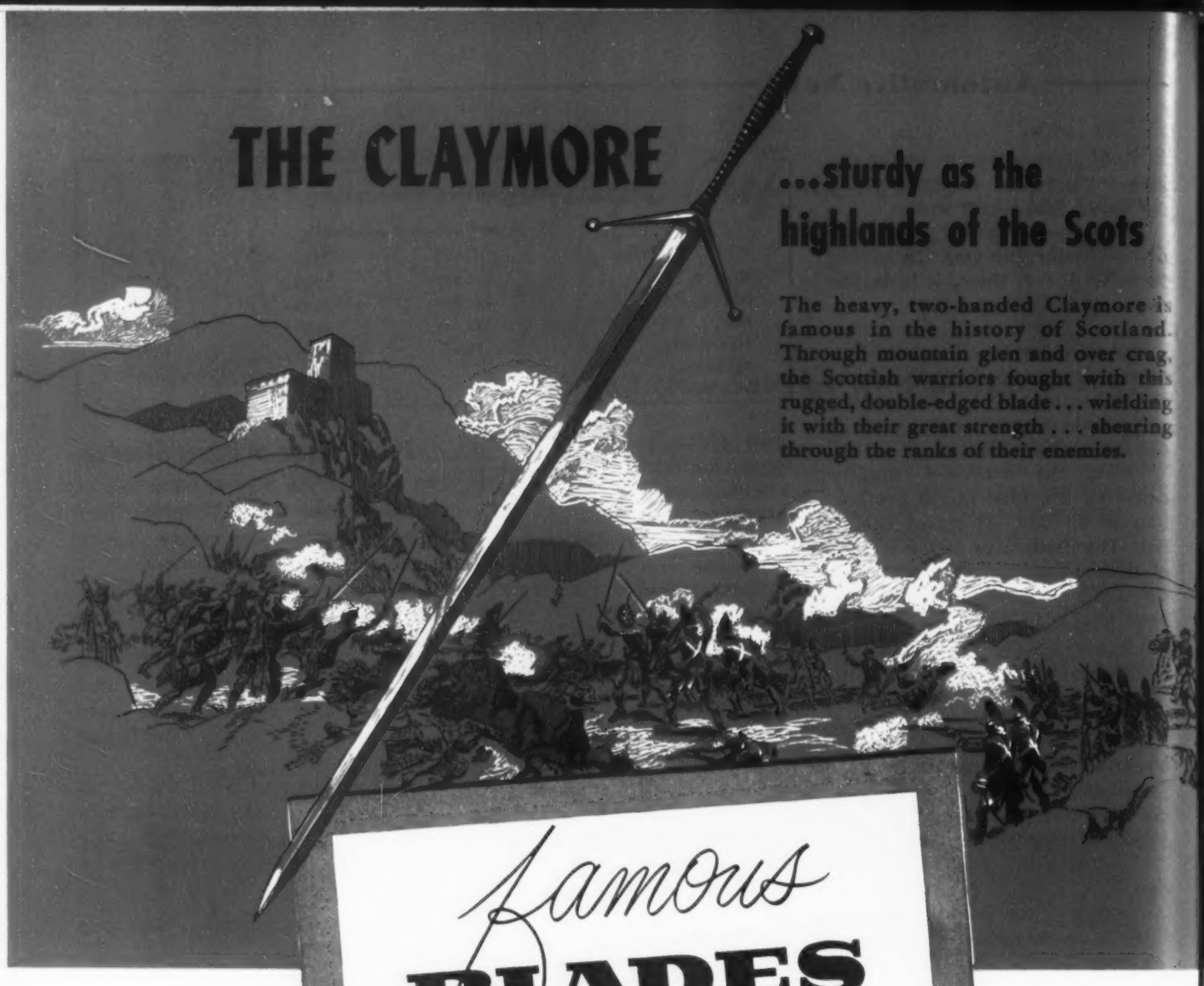
One of the biggest surprises in automotive "extras" is the way power steering has caught on with car purchasers.

Original suppliers of the units are swamped as auto companies have stepped up scheduling of power steering in late 1952 and first 1953 cars. Independents and even one of the big three were caught without supply sources and are scrambling for units.

Trend started at Chrysler in 1951. The company installed more than 67,000 power steering units before the end of October this year.

THE BULL OF THE WOODS By J. R. Williams

HE'D LIKE TO GET GOIN' ON THEM SO TH' NIGHT MAN WON'T GET ALL TH' SNAP OFF THEM AN' LEAVE HIM TH' TRICKY FINISHIN' JOB ON 'EM TOMORROW! WHAT WOULD YOU DO--LIFT ONE IN OR WAIT ON TH' CRANE?
WELL, IF YOU LIFT ONE IN, TH' CRANEMAN AN' BOSSES WILL EXPECT YOU TO LIFT THAT SIZE YOURSELF, AN' TH' GANG DON'T LIKE YOU SETTIN' A BAD EXAMPLE! SO I'D WAIT TODAY AN' WORK T'MORROW!
11-21
J.R.WILLIAMS
THE TRICKS OF THE TRADE
T. M. Reg. U. S. Pat. Off.
Copr. 1952 by NEA Service, Inc.


THE CLAYMORE
...sturdy as the highlands of the Scots
The heavy, two-handed Claymore is famous in the history of Scotland. Through mountain glen and over crag, the Scottish warriors fought with this rugged, double-edged blade . . . wielding it with their great strength . . . shearing through the ranks of their enemies.

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Have Will but Not Means to Cut Budget

Republicans blocked by defense spending in cutting budget drastically . . . Seek cut of from $85 billion to $70 billion . . . Army seeks electric power from atoms—By G. H. Baker.

Close look at the upcoming political alignment in Congress points up an inescapable conclusion: Republicans are not going to be able to shrink the new budget as much as they'd like.

Some cuts will definitely be made, however. President Truman and his advisors are rumored to have taken the position that they might as well "throw in the kitchen sink" in preparing their estimates for fiscal 1954 spending.

The story goes their congressional colleagues will no longer be in the position of having to justify the proposed expenses. Burden of proof now rests with the Republicans. But the more fat the Democrats pad on the budget, the greater the credit Republicans will get for stripping it off.

Save $15 Billion? — While details of the new budget are not to be made public until the middle of January, it is learned that current White House thinking favors a total budget figure of around $85 billion. Republicans have proposed holding the new outlays to a top of $70 billion. Thus the forthcoming estimates represent a real challenge to Republicans who believe that the machinery of government is overgrown beyond reason.

President-elect Eisenhower is on record as committed to trim the budget to $60 billion by 1956. If this plan is to be carried out, it means that the biggest reductions in spending will have to wait at least 2 years—possibly 3 years. The biggest blocks on forthcoming budget expenditures and in the future fiscal 1955 budget are for defense projects to which Congress is already committed.

The Painful Way—To carry out any large scale cuts in the next two budgets it would be necessary for Congress to shrink or halt such long-range military programs as procurement of planes, tanks, guns, and construction of offshore military bases.

Such a move is not believed to be in keeping with Mr. Eisenhower's views on military preparedness. Nor does either political party believe that industry, heavily pledged to defense work, should suddenly be hit with a deluge of contract cancellations. Lower rate of federal spending, will instead come about by degrees. This will minimize any possible dislocations in industrial production.

BUDGET: Banker Joseph Dodge studies the federal budget for Mr. Eisenhower.

Back to Work—The new Army study of nuclear reactors with its goal of filling some military requirements for electric power is a return to familiar ground for the Corps of Engineers. The "Manhattan District" (developer of the atomic bomb) was a World War II agency of the Corps of Engineers.

What the Army wants is a practical method of filling "certain" demands for electric energy from atomic sources. Just what these "certain" demands are is not made clear. Security regulations prohibit a more definitive statement.

Big Savings—The Army believes "very large" financial savings may result from success of the new project. It is pointed out that the potential savings in fuel transportation costs alone may be substantial.

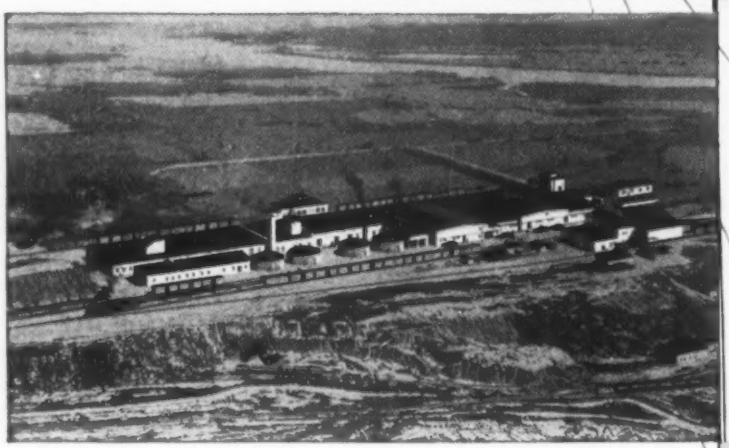
A "high priority" will be assigned the new project. Personnel contacts with industry are now being established in order to secure the best available industrial and scientific talent for the job.

Streamlined Agency — National Production Authority is planning to whittle down its Washington staff still further. Field office staffs are already at a "working minimum"—by government standards. Agency officials are now planning to wind up the calendar year with 2500 employees on the Washington payroll.

Peak employment of NPA officials at the Capitol was about 4750 —not counting those on WOC (without compensation) basis. Present payroll is about 3250. Attrition will remove about 250 of the scheduled reduction of 750 before the end of the year, it is believed, leaving about 500 workers to be fired or transferred to other agencies.

Draft — Largest group of draftees—48,000—in nearly a year is to be tapped for service in January, under present Defense Dept. plans. Army intends to take the entire quota. Air Force and Navy still find enough volunteers to keep authorized strength.

ILLINOIS CLAY PRODUCTS HAS ALL 3



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NICKEL: Defense Jacks Up Expansion

DPA and Defense Dept. huddle, raise nickel goal to 190,000 tons by 1955 . . . Output of jet engines rises sharply this year . . . Jets use nickel heavily—By *A. K. Rannells.*

Coming out of a huddle with the Defense Dept. at which increasing military requirements were reviewed, Defense Production Administration last week revised upward its expansion goal for nickel.

New target is a total supply of 190,000 short tons which must be available by 1955. This represents an increase of 89,000 tons over the 1950 supply of 101,000 tons.

Defense and production officials have repeatedly emphasized that there will be no nickel allocations except for the most essential purpose and that the shortage will continue through the foreseeable future.

Nicaro Helps — Last January, DPA announced an expansion goal of 132,000 short tons by 1954. Since then, provision has been made to acquire additional tonnages. Opening of the Nicaro plant in Cuba has increased the supply.

Total United States consumption in 1951 was approximately 86,500 tons. About 44 pct of this went into stainless and other steel.

In the meantime, Defense Dept. has pushed its shift from piston to jet propulsion for aircraft. Nickel is essential to production of steel for jet engines.

Most of the production problems which had held up output of components for several models had been solved by mid-year. As a result, the output of jets has been increasing faster than the planes in which they are to be installed. Delivery is now more than twice what it was at the beginning of 1952.

2-Year Jump—For example, two of the principal jet engine producers are turning out engines at a combined rate of more than 60 per day as compared with about 17 a day less than 2 years ago.

This means that the new jet engines which will power the B-60 swept-wing jet version of the B-36, not to mention the current B-47 strato-jet, the Sabre, the Navy's Panther and Banshee, are past the development stage and approaching volume production.

Deliveries of military aircraft have tripled in 2 years. Roughly, this production runs at a rate of more than 800 a month.

Significant to the supply and consumption of nickel is that by the end of 1952 close to 84 pct of all aircraft engine deliveries will be in the form of jets. It's hoped the rate will reach almost 90 pct by the end of 1953, leaving only about 10 pct of production in the piston-propelled class.

Lusty Appetite—Production of these jet power units eats up nickel with a fantastic appetite. Some require as much as 2400 lb per unit.

Domestic production of nickel is negligible. The figure for 1951 was about 760 tons. Traditionally the bulk of our needs must be imported.

Canada has been the usual mainstay. Last year, Canadian shipments accounted for about 88,000 tons. This is expected to hop higher next year as a result of two agreements with the Falconbridge plants in Ontario.

With the Nicaro plant in production, the supply is expected to be increased over the near future by up to 15,000 tons annually.

But the outlook is still far from optimistic. Officials say that the new nickel expansion goal must again be reviewed not later than next March—possibly sooner.

"The boss will do almost anything to save on his electric bill."

RENEGOTIATION:

Subcontracts to exempt prime contracts not automatically exempt.

Exemptions for prime contracts no longer will be automatic for subcontracts to which they are related, Renegotiation Board has ordered in one of two changes to its regulations.

Affected is a section of the regulations concerning the Board's authority under the 1951 Renegotiation Act to grant exemptions for certain types of contracts and subcontracts. Such types are (1) secret contracts, (2) those in which provisions are adequate to forestall excessive profits, and (3) those where profits can be determined at the time the contract price is established.

Formerly, regulations allowed exemptions for subcontracts when related prime contracts were exempt, except when prime and subcontracts performed outside the U. S. were involved.

Excess Inventory—In a second change of regulations, the Board ruled that an increase in value of a defense contractor's "excess inventory" of raw or semi-processed materials which are exempt from renegotiation under the 1951 act will be excluded entirely from his renegotiation sales. This action, the Board said, makes the regulations comply more exactly with the 1951 act requirement that any profit attributable to this increase in value "shall be excluded from consideration."

Earlier, regulations merely allowed increased-value stock of materials as a credit against refund of excessive profits.

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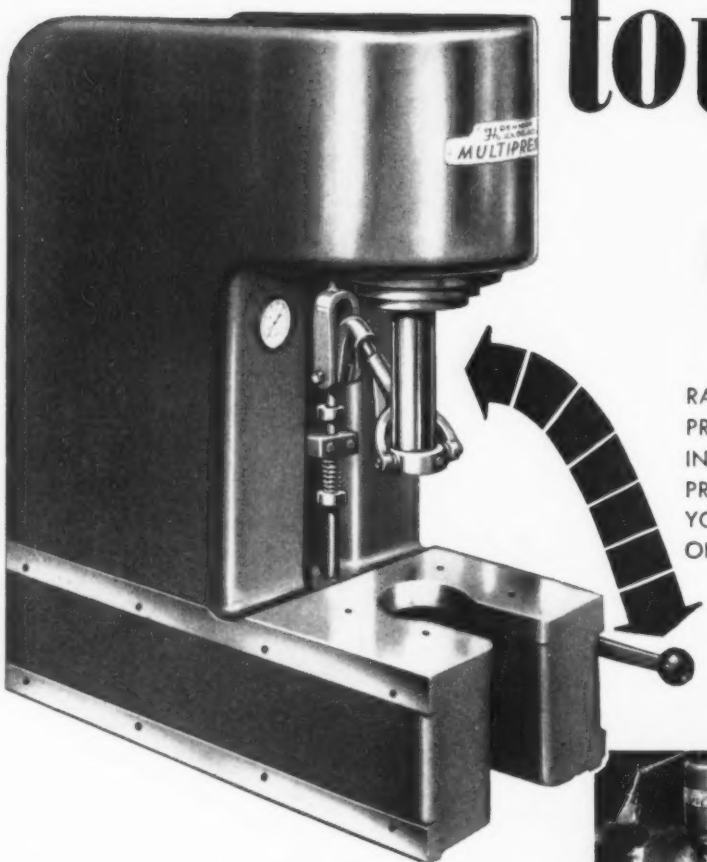

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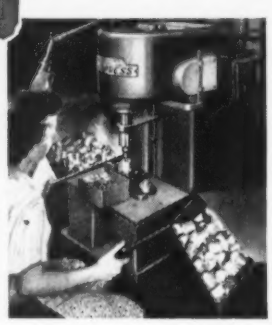

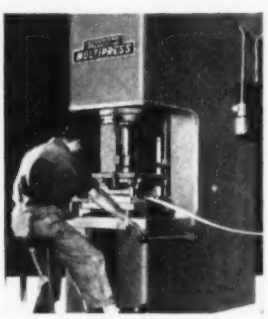

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Western Steel Future Looks Good

Increased population, rising freight rates cited as keeping demand for local steel high . . . Area now uses 13.5 million tons annually, makes only 6 pct of U. S. total—*By T. M. Rohan.*

Tremendous population growth and mounting freight rates are combining to assure the future of western steel.

Western steel men at the San Francisco region technical meeting of the American Iron and Steel Institute last week heard Wm. J. McClung, Bethlehem Pacific's vice-president in charge of operations, spell out factors which make it appear certain. Among them:

Eleven western states use 13.5 million tons but produce only 6.2 million or 6 pct of the U. S. total;

Early deterrents such as lack of population concentration, capacity of eastern mills to meet demand, cheap freight and limited local capital "have been reduced in importance";

And World War II brought great migration to the West. The newcomers stayed. Hundreds of thousands more have since come.

Walter S. Tower, Carmel, Calif., retired Institute president, said if demand holds up through March, 1953, production will hit 10 million tons per month.

In Other Speeches—Richard E. Kerr, Geneva Works, U. S. Steel, outlined work in progress on eliminating premature cracking of molds at Geneva, Utah.

Richard Aubrey, Kaiser Steel, outlined western welded steel pipe production methods.

M. S. Farwell, Bethlehem Pacific, reading a paper by V. P. Weisman, urged realistic building codes and pointed out how light cold formed steel panels are exerting increasing influence in building design.

A. H. Zeilinger, Colorado Fuel and Iron Works, urged united action against moral decline, indebtedness, usury and complacency in an inspirational talk.

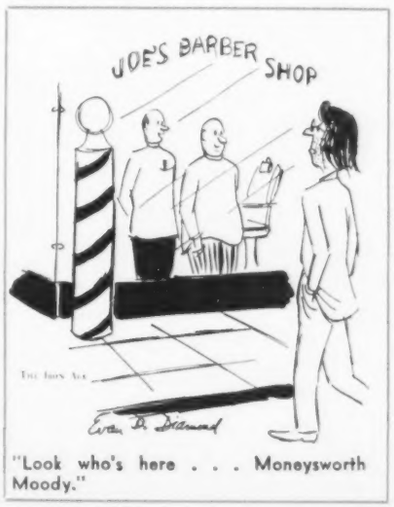
Northwest Slump—Business is poor and the immediate outlook gloomy for northwest metal fabrication shops and foundries these days. Shops are hit by material shortages, lack of orders and the power shutdown.

Hydraulic Supply Mfg. Co. of Seattle, mining machinery firm, had its 2 worst months in recent history on material shortages. Stetson Ross Machine Co., woodworking machine manufacturer, is down to 35 employees from 120 a year ago.

The 10-pct power cut, based on last year's consumption, will hit hardest at the many industries expanded since then. Relief applications are expected to be heavy, especially for defense plants and their suppliers.

More Texas Steel — Lone Star Steel Co. at Daingerfield, Tex., is rushing work on four 225-ton open-hearths and will soon barge into the steel picture in addition to present pig production.

The Texans are mining ore by dragline and through beneficiation get 1 ton of 55-pct ore for each 4 extracted. They have a 10-mile ore haul to the furnace and all other raw materials are available within 100 miles. Some steel finishing facilities are also rumored.



"Look who's here . . . Moneysworth Moody."

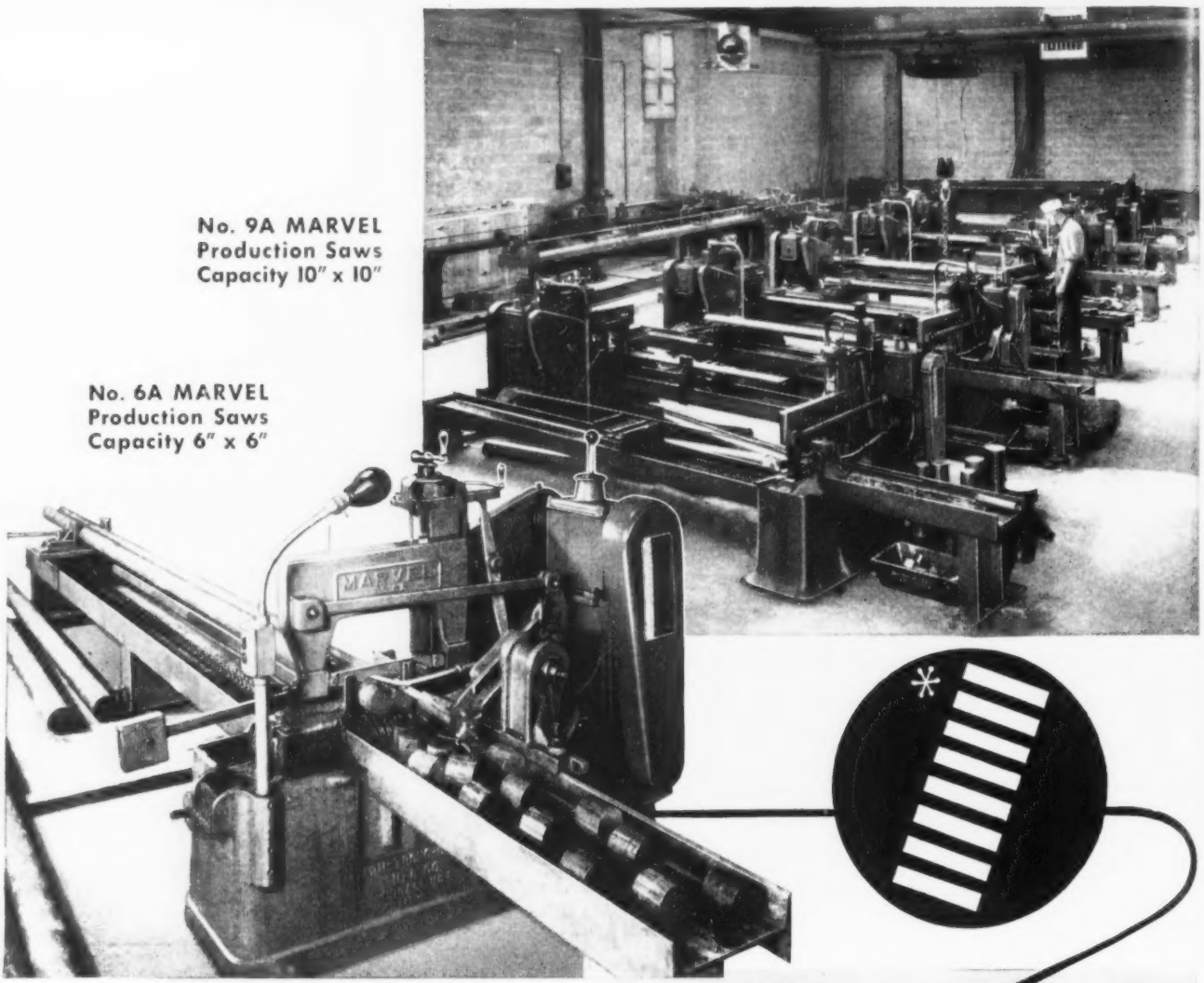
Cold Finish Mill—Sierra Drawn Steel of Los Angeles moved into Seattle last week with announcement of a cold finish mill for bars 1½ to 6 in. Fred J. Robbins, Sierra president, said the move was made to supply shafting in large bar sizes, turned and polished or in turned, ground and polished sections for heavier type industries there.

Additional plans call for a drawbench for smaller bar stock and battery of grinders. James Allison, veteran Sierra representative in Seattle, heads the new subsidiary.

Jumbo Annealer—Huge jigs for the B-52 jet bomber have required installation of one of the largest annealing furnaces in the Northwest at Boeing. Costing $213,000 it will handle assemblies up to 40 ft long. The floor is mounted on wheels like a railroad car and runs in and out of the furnace on a track, the ends forming a heat seal.

British Planes — Vickers Armstrong of England, builders of the 4-engine turbo-prop Viscount commercial transport plane, is planning to invade the U. S. market. Consolidated Vultee of San Diego has had the medium and short range transport field to itself since Martin started 100 pct military production after discontinuing the 404.

Convair's current hot item is the 2-engine 340 at slightly over $500,000 with 175 on order. Some of the earlier design 240s of which 176 were ordered are also still in production.



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A Better Break on Renegotiation

Greater understanding of industry's problems may mean less strict renegotiation policy . . . Market decline anticipated . . . Shadow plant plan outlined—*By E. C. Beaudet.*

Machine tool builders facing renegotiation proceedings should be in a better position than they were at the end of World War II. Greater understanding of the industry's problems by the government's Renegotiation Board will result in a more realistic approach to profits made on defense orders placed since the Korean War.

This heartening news was related to industry members last week by A. G. Bryant, vice-president, Cleereman Machine Tool Co., and chairman of the industry's committee on renegotiation.

Major Factors—Speaking at the association's annual meeting in White Sulphur Springs, W. Va., last week, he said, the most important factors affecting renegotiation proceedings are: An anticipated market decline, inroads by foreign builders into domestic markets, loss of foreign business, and possible future market saturation.

The peak of emergency production is about to pass, he said. Earnings during 1951 and 1952, which normally would have been spread over several years have been concentrated in a period of high excess profits taxes, price ceilings and renegotiation.

This situation has been recognized by the Renegotiation Board in its regulations, Mr. Bryant stated. But these facts must now be accepted by all regional boards if the machine tool industry is to be treated fairly.

Profits—If the industry is not allowed to retain sufficient profits to tide it over anticipated lean periods, it will be left in a weakened condition which would impair the defense effort and threaten the country in a new crisis.

Based on industry meetings with the Renegotiation Board, Mr. Bryant is confident government officials have a better understanding of the industry's problems than during World War II renegotiation. He singled out the "partial mandatory exemption" as an attempt by Congress to ward off a post-emergency saturation of the machine tool market.

However, he said, this exemption is applicable only to privately-purchased machines and does not extend to government purchases. It provides only partial relief because the large stock of government-owned machines will depress the post-emergency market as much as privately owned equipment.

Market Saturation—Threat of market saturation is aggravated by large government purchases of machine tools during the last 2 years. Renegotiation Board has already been advised of this problem and it should be brought to the attention of Congress during its next session.

Mr. Bryant also pointed out that in a mixed civilian and defense economy and particularly with a drop in machine tool volume there would be no need for renegotiation in 1953 to protect procurement on machine tools which are not military end products.

"Did he say how much it weighed?"

Shadow Plants—A way of bolstering the machine tool business with government "shadow" or standby plants was outlined by Ralph S. Howe, director of National Production Authority's Metalworking Equipment Div.

Mr. Howe told association members that the industry is now producing at an approximate rate of $1.2 billion a year, although 1952 shipments may not go much above the $1 billion figure.

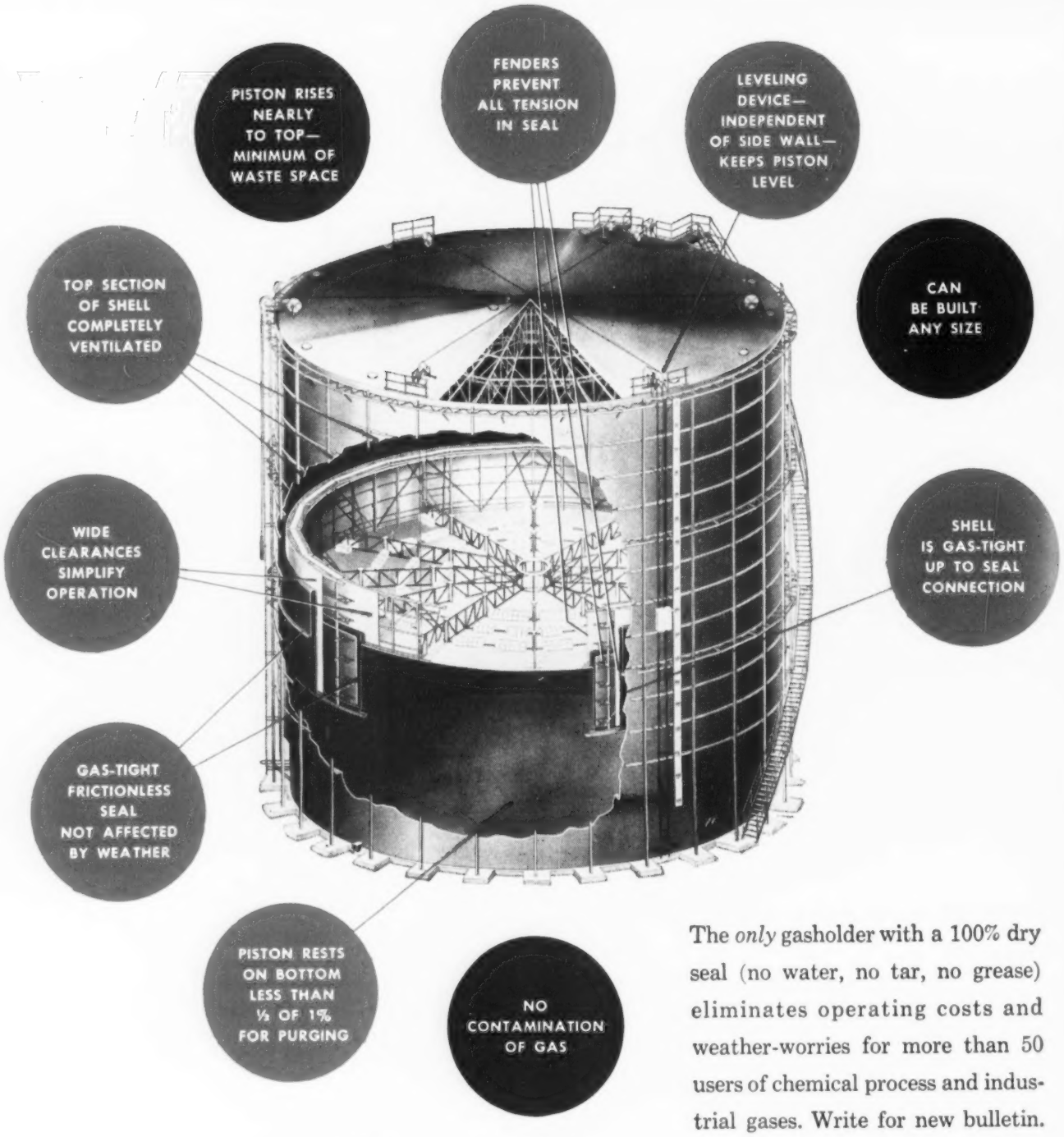
Some machine tool plants are currently operating at less than capacity, he said, having completed their biggest orders for the defense program. This means their production schedules are being revised downward for 1953.

No Stockpile—Knowing that the machine tool industry in general does not favor the government's creating a tool stockpile, Mr. Howe advanced the "shadow" plant idea. These plants would be tooled to produce specific, strictly military items which, he declared, would take the plan out of the stockpiling category.

The NPA official also said that there should be a change in the federal tax structure so that both builders and buyers of such equipment can recover their capital investment more quickly.

Although speaking for himself and his agency, it is known that similar thinking along this line is going on in some quarters in the Pentagon. Idea is to make it feasible to scrap older and near-obsolescent tools more quickly.

Mr. Howe also stated that the industry's distribution order has been amended to provide for a frozen period of 3 months prior to shipment. During this time nonrated orders for tools not on the critical list may not be diverted to military uses.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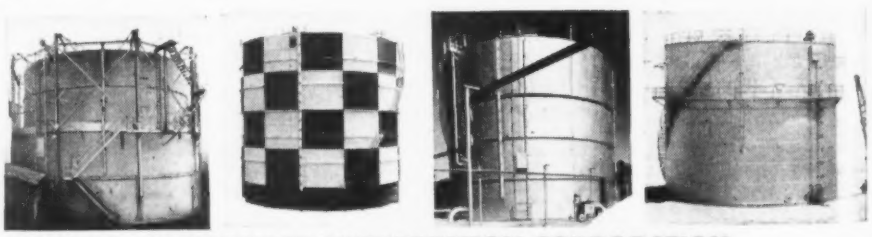

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Machinery Demand Continues Firm

Builders confident despite expected decline in DO's . . . Easing of steel supply and new construction to bolster '53 demand . . . Hot-rolled supply mounts—By *F. Sanderson.*

Based on floor sales and inquiries at the Montreal Tool and Equipment Show staged last week, Canadian machinery and tool builders are confident market demand will be heavy at least through 1953. While many tool builders were prepared to give spot delivery, lead time on some types of equipment ranged up to 3 months.

More than 125 companies were represented at the show, including exhibits from the U. S., Germany and Great Britain. Few other European countries displayed their equipment.

Market Loss — Machinery and equipment builders in Canada are optimistic regarding business for the coming year despite expectations of a decline in equipment demand for heavy defense industries. This loss is anticipated because many plants which have been under construction for the past couple of years, now are equipped and in production. Balancing the drop in this market is the prediction that demand for maintenance equipment and small tools will increase.

Another favorable factor leading to sustained demand for equipment and tools is the large number of new plants and additions being erected. These new plants will produce practically all types of goods with the majority concentrating on consumer items.

Renewed Interest—Many companies, Canadian, U. S., British and European, have regarded Canada as the land of industrial promise for several years. But restrictions on steel and other building materials as well as equipment have delayed construction programs. With prospects of an early easing of steel supply, plant construction plans are gaining renewed interest.

While no predictions have been made beyond 1953, the majority of machinery builders are confident demand will continue at a high rate for several years. Current market is brisk and 1952 sales equal and in some respects surpass those of 1951. Builders expect the coming year to compare favorably with the current twelve months.

Steel Supply — While Canadian steel supply is easing in some directions, first quarter allocations by mills indicate the only increase in supply is in hot-rolled sheets. Purchasing Agents' Association reports additional tonnage of cold-rolled sheets and bars is not expected until second quarter, 1953. Steel plate will continue to be in short supply through at least the first half of next year. Galvanized sheet supply cannot be increased until additional equipment is purchased and in operation.

Because of uncertainty about supply and demand for the second quarter, orders for European steel have not yet been booked for spring delivery in Montreal.

"That short girl, transfer her to another department."

More Nickel—Falconbridge Nickel Mines Ltd., Canada's second largest nickel-copper producer, is proceeding with an extensive expansion program. When completed it will enable the company to reach production of 35 million lb of nickel annually. Current rate is 28 to 30 million lb.

To finance the expansion Export-Import Bank in Washington has provided a credit up to $5 million. An advance of $6 million was arranged earlier under agreement with the Defense Materials Procurement Agency.

The arrangement calls for Falconbridge to supply 50 million lb of nickel to the U. S. over a period of 9 years and up to 1.5 million lb of cobalt. An additional market for 25 million lb of nickel and a similar quantity of copper is also open to Falconbridge under the contract.

Nickel is a metal vital to American production of jet engines—and U. S. jet production is climbing steadily.

Jet Plant—Thompson Products Ltd., St. Catharines, is completing a $6 million jet aircraft engine parts plant, scheduled to start production in December. Some equipment has already been installed. The company recently received two shell contracts, one for smoke shells, the other for high explosive shells.

Beach Foundry Ltd., Ottawa, is starting production of domestic ranges under an agreement with the Gibson Refrigeration Co., Greenville, Mich. Under the agreement Gibson ranges will be manufactured in Canada by Beach Foundry and distributed through branches of Canadian Fairbanks Morse Co. In addition, Beach will enlarge the line of products sold in Canada under the Beach name.

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Centrifugal pumps

Allis-Chalmers varied line of centrifugal pumps is highlighted in a new *Handy Guide to Selection of Centrifugal Pumps.* In addition to covering general purpose, double-section, multi-stage, special purpose and axial flow pumps, the bulletin has a head-capacity table for single-station, double-section Allis-Chalmers pumps. Special purpose pumps mentioned include solids handling, fractional hp and coolant and circulating units. *Allis-Chalmers Mfg. Co.*

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Drilling, tapping

The Hole Story is a series of interesting bulletins covering the Carlton Machine Tool Co.'s line of radial drills for drilling, tapping and boring. Carlton radial drills are designed, assembled and tested in individual units before final assembly. All units are made up of sub-units and are assembled in oil-sealed housings. *Carlton Machine Tool Co.*

For free copy circle No. 4 on postcard.

Skids, jacks

Kilbourne & Jacobs Semi-Live skids and jacks discussed in a new circular are designed for assembling stock, to operate in fork truck feeder systems and for multi-floor warehousing. In many operations they provide a compact and efficient system of materials handling and can be operated by unskilled labor. *Kilbourne & Jacobs Mfg. Co.*

For free copy circle No. 5 on postcard.

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Lathes

The T Lathes covered in a new brochure fill an urgent need for facing, turning and boring thin-walled section work of large diam and short length. One new feature of these units is the fact that they have a bed with carriage-carrying section at right angles to the lathe centerline. *Lodge & Shipley Co.*

For free copy circle No. 6 on postcard.

Motor control

Arrow-Hart & Hegeman Electric Co. has published a new 4-p. folder telling the story of the design progress behind the development of its Type "RA" magnetic motor control line. Design evolution from Arrow-Hart's 1930 clapper type starter to the present right-angle types is clearly shown in chart form. *Arrow-Hart & Hegeman Electric Co.*

For free copy circle No. 7 on postcard.

Castings

Sessions Hyprecision castings process, outlined in a new booklet, is a method of making castings with unusually fine surfaces, high fidelities to designed contours and close dimensional limits and tolerances. The Hyprecision process can be used to produce entire castings or only on sections of a casting while ordinary methods are used on other parts. *Sessions Foundry Co.*

For free copy circle No. 8 on postcard.

Rivets

Operation of B. F. Goodrich's Rivnuts is clearly explained in a new pop-up mailing piece. Rivnuts are one-piece blind rivets with inside threads that can be installed and headed from one side by one man. They can be used to form a compression fit where positive sealing is needed. *B. F. Goodrich Co.*

For free copy circle No. 9 on postcard.

Balancing machines

A unique balancing principle is used in Trebel dynamic and static balancing machines outlined in a folder available from Kurt Orban Co. Instead of picking up vibrations of a rotating piece and then calculating the unbalance through intricate electrical networks, the Trebel unit introduces a counter-motion into the bearings in which the piece rotates until a perfectly smooth running condition is obtained. This operation takes only seconds. When the machine is running smoothly, the balancing machine indicates the magnitude as well as the location of unbalance. *Kurt Orban Co., Inc.*

For free copy circle No. 10 on postcard.

Welding

Advantages of argon-oxygen mixtures in shielded inert gas metal arc welding of carbon steels are analyzed in a new booklet, *Sigma Welding of Carbon Steels.* This 12-p. study includes the effect of gas flow, current density and welding speed on porosity and the effect of voltage on penetration when using a 5 pct oxygen mixture. *Linde Air Products Co., Div. of Union Carbide & Carbon Corp.*

For free copy circle No. 11 on postcard.

Grinders

The Rivett Model 84 internal external grinder is particularly adaptable for use in toolrooms and die shops and production jobs where quantities do not justify purchase of a more expensive specialized machine. Hole grinding capacity is from the smallest up to 3 in., with a maximum depth of 4 in., depending on the diam. The unit is described in detail in a new folder. *Rivett Lathe & Grinder, Inc.*

For free copy circle No. 12 on postcard.

Liquid filters

Dollinger liquid filters are outlined in a new 12-p. folder. Specifications, performance data, photos and descriptions of recommended types of filter media and a check list of liquids that can be filtered are all given. *Dollinger Corp.*

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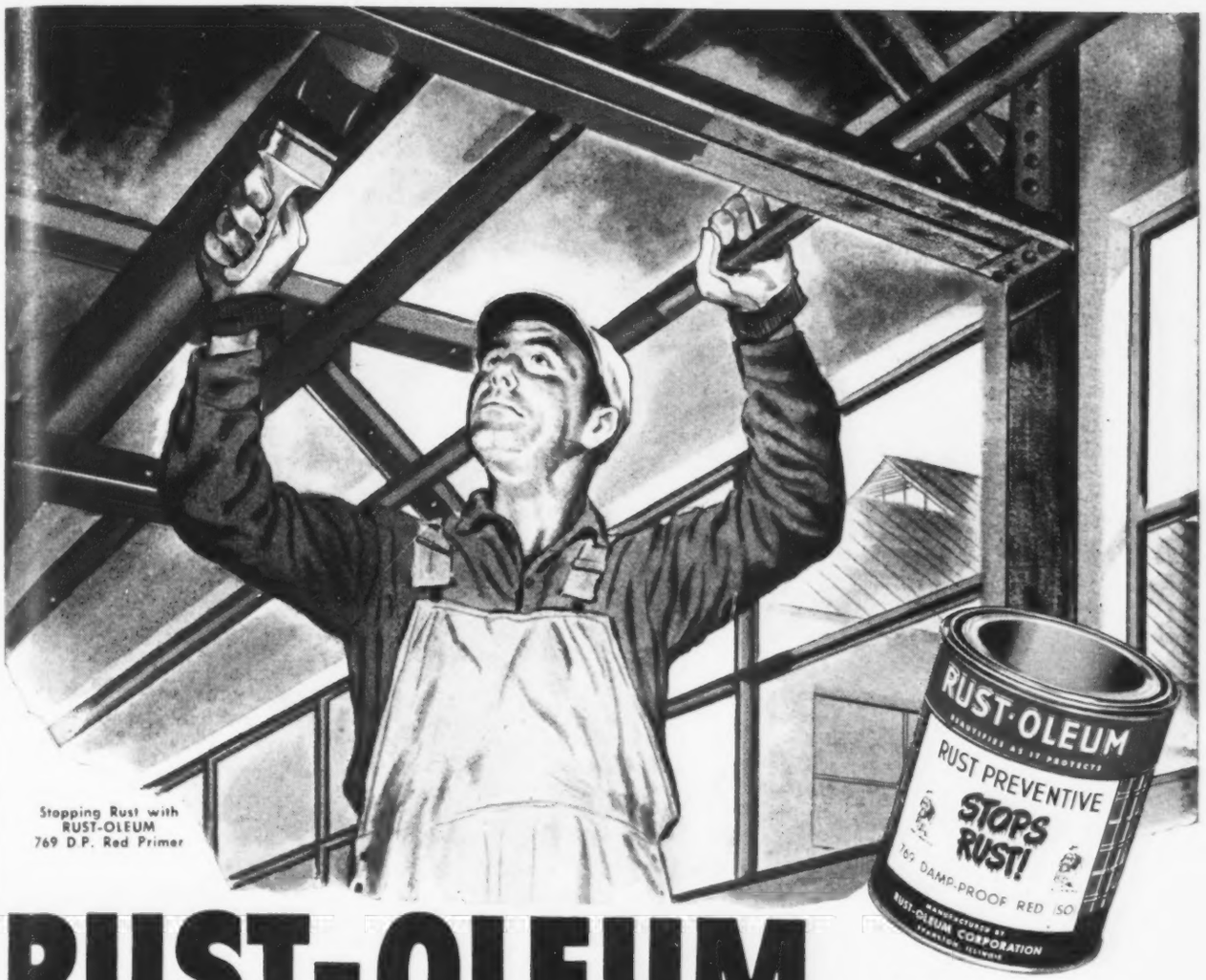

Stopping Rust with RUST-OLEUM 769 D.P. Red Primer

RUST-OLEUM

Look for this label. Be sure it's genuine RUST-OLEUM!

All Colors, Aluminum and White—
Beautifies As It Protects!

This practical coating may be applied directly over surfaces already rusted without removing all the rust! Simply wirebrush and use sharp scrapers to remove rust scale and loose particles . . . sandblasting and chemical pre-cleaning are not usually required. Easy to apply by brush, dip, or spray . . . dries to a firm, pliable coating. Cut your maintenance costs, save metal — with RUST-OLEUM! Prompt delivery from Industrial Distributor stocks in principal cities.

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FREE SURVEY: A RUST-OLEUM specialist will gladly survey your rust problems. He'll make specific tests and recommendations. No cost or obligation. See Sweets for complete catalog and nearest RUST-OLEUM distributor, or write for literature on your company letterhead.

CLIP THIS TO YOUR LETTERHEAD
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- ☐ Have a Qualified Representative Call
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- ☐ Complete Literature
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Clearing presses are much in evidence in the Kaiser-Frazer Shadywillow plant, opened some months ago in the Wheeling area. The one in the photo is part of a line of four Clearings forming a production group in the new plant.

Kaiser-Frazer knew exactly what they were doing when they chose these Clearing presses. You see, there are Clearing presses in the parent plant at Willow Run, and they've been on the job there for quite a while.

CLEARING MACHINE CORPORATION

6499 WEST 65TH STREET ★ CHICAGO 38, ILLINOIS

HAMILTON DIVISION, HAMILTON, OHIO

CLEARING PRESSES

THE WAY TO EFFICIENT MASS PRODUCTION

Free Publications

Continued

Wall panels

An 8-p. technical bulletin is available describing Seaporclad, a new porcelain enamel wall material. Seaporclad insulating panels are ideal for curtain wall construction to replace heavy masonry walls and are also used as a veneer for exteriors, interiors and for both temporary and permanent partitions. The panels are of sandwich construction with skins of diversified metals laminated under high pressure to insulating cores. *Seaporcel Metals, Inc.*

For free copy circle No. 14 on postcard, p. 97.

Metal stampings

Methods of improving products, reducing their cost and extending their service through metal stampings is thoroughly discussed in a 24-p. book available from Crosby Co. Concise analyses are presented as examples of the engineering and modern techniques that distinguish the company's products. As a convenient guide to the full scope of these services, the book summarizes the diversified equipment that is available for forming individual parts and fabricating complete assemblies. *Crosby Co.*

For free copy circle No. 15 on postcard, p. 97.

Potentiometers

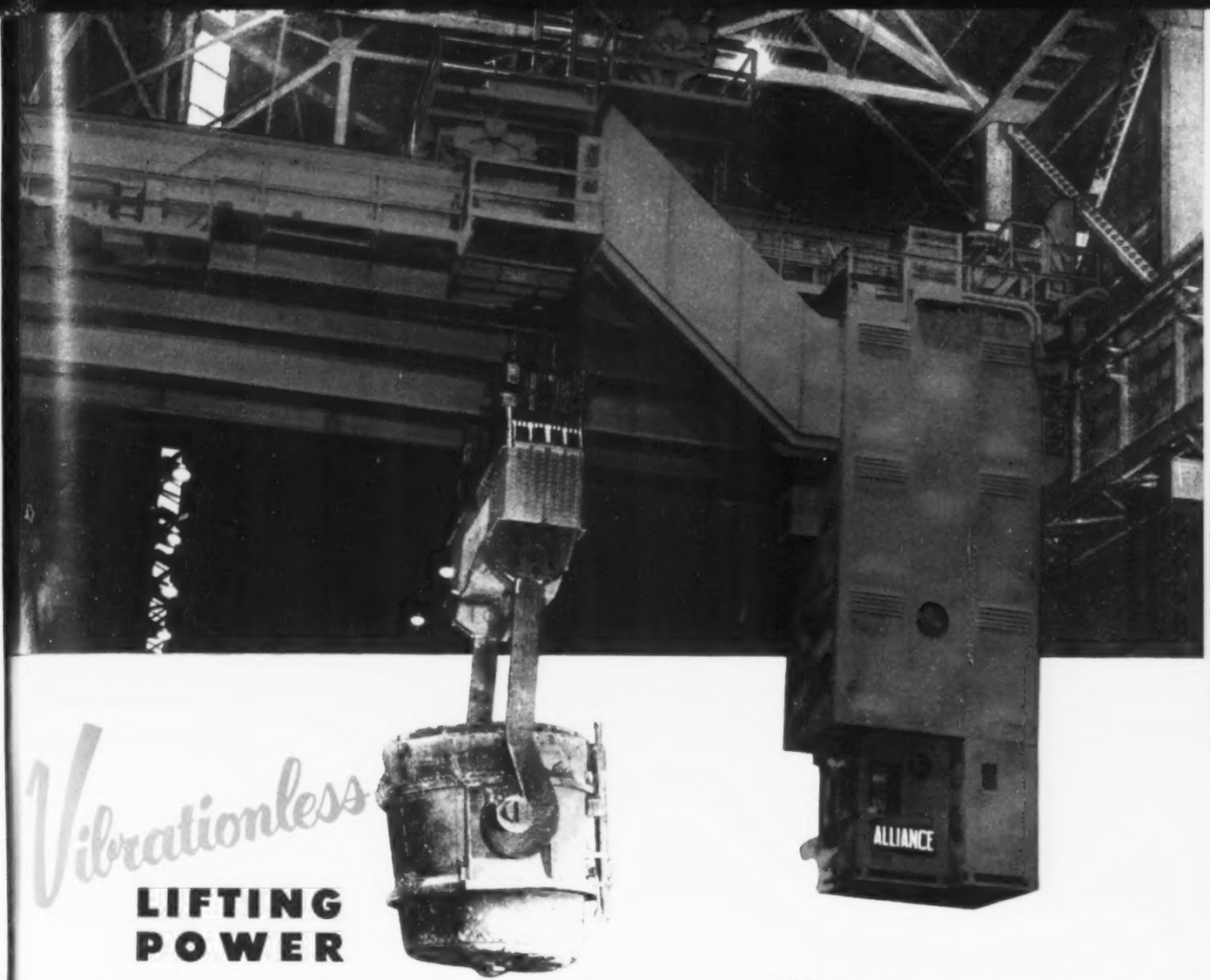
Specification Sheet 179 gives full details on the new Brown Electronik Strip Chart Potentiometer. The unit is a single record type with 2 sec full scale pen travel. It is unaffected by vibration and is ideally suited for service in forging shops and for other rugged-duty applications. *Minneapolis-Honeywell Regulator Co.*

For free copy circle No. 16 on postcard, p. 97.

Lubrication systems

Trabon Engineering Corp. has published a 4-p. folder containing valuable information for anyone interested in the proper planning and engineering of centralized lubrication. Two systems are described in detail; a manifold lubrication system and a reversible system. *Trabon Engineering Corp.*

For free copy circle No. 17 on postcard, p. 97.



Vibrationless

LIFTING POWER

300/60/20-TON, 4-GIRDER DOUBLE TROLLEY *Alliance* LADLE CRANE

● Building big cranes has been our business here at Alliance for more than 50 years. Whenever the industrial world has required cranes of large capacity, it has always found The Alliance Machine Company with designs and "know-how" to meet its requirements.

The 4-girder, double trolley ladle crane illustrated here was built for the Homestead Steel Works of the United States Steel Company to handle the increased Open Hearth capacity. It required a 4-story cage to house the electrical equipment to control the various motions of this crane. The three upper stories contain the magnetic control equipment and resistors. The bottom section of the cage houses the master controllers and the operator and is insulated.

This ladle crane is equipped with a two-motor, synchronized worm drive, interlocked double drum type main hoist. The synchronizing shaft employed in this scheme of gearing not only eliminates the undesirable ratchet gears but makes possible an additional safety feature in case one of the hoist motors fail. Under this condition both worms are driven by the remaining motor and all gearing functions as with two motors. In case of failure of one hoist motor on the conventional drive **without** the synchronizing shaft, hoisting is accomplished by **only one** set of gears. This imposes a double load on active gearing, the second drum being driven through the interlocking drum gears. The hoist gearing is so proportioned that the full capacity of the crane can be lifted by one motor without exceeding the quarter-hour rating.

The drum gears and pinions of the main hoist of this new crane have precision-cut, single-helical teeth, and in cooperation with the worm drive, assure vibrationless operation on either high or low speed hoisting and lowering.

All gears are fully enclosed and operate in a bath of oil, assuring long life and low maintenance.

The 4-part safety rope system installed on this crane affords the highest degree of safety in rope reeving.

Why not consult The Alliance Machine Company engineers when you have heavy material handling problems?

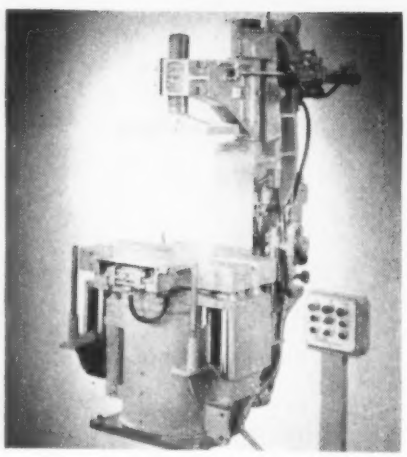
THE ALLIANCE MACHINE COMPANY

MAIN OFFICE
ALLIANCE, OHIO · PITTSBURGH OFFICE
1622 OLIVER BUILDING, PITTSBURGH, PA.

LADLE CRANES • GANTRY CRANES • FORGING MANIPULATORS • SOAKING PIT CRANES • STRIPPER CRANES • SLAB AND BILLET CHARGING MACHINES • OPEN HEARTH CHARGING MACHINES • SPECIAL MILL MACHINERY • STRUCTURAL FABRICATION

NEW EQUIPMENT

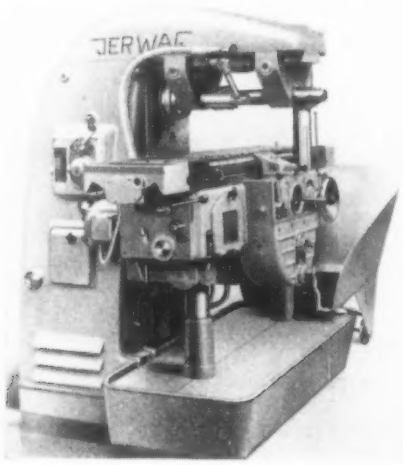
New and improved production ideas, equipment, services and methods described here offer production economies . . . just fill in and mail the postcard on page 97 or 98.



Two buttons actuate complete molding cycle

New automatically controlled jolt-squeeze-strip/draw machine features powered swing-head, two-button operation and both up-draw and down-draw action. Pushbutton electrical controls govern all operations providing fully automatic or selective manual control. Operator pushes only two buttons to actuate a complete molding cycle. Jolting action is timer-controlled, and the squeeze is regulated by a pressure switch. Stripping action is controlled automatically and stripping pins are adjustable to accommodate a range of flask sizes. Squeeze capacity is 16,000 lb and jolt capacity is 1500 lb on standard 80 psi line pressure. Pattern draw is 10 in.; maximum squeeze stroke, 12 in. Flask space is 19 to 31 in., l to r; 16 to 31 in., f to b. The molding machine is equipped with the Spo inverted jolt mechanism. *Spo, Inc.*

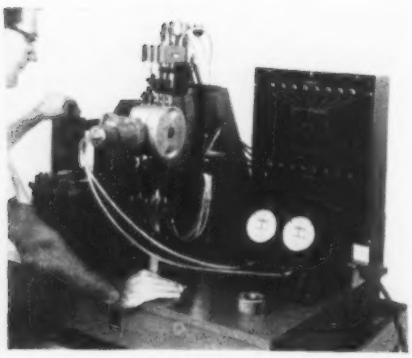
For more data circle No. 18 on postcard, p. 97.



Down-cut milling without special accessories

The Jerwag milling machine is designed to make full use of the advantages of climb or down-cut method of milling without special supports or accessories. The machine permits utilization of high-speed cutting tools at their peak efficiency. Because it is built throughout for down-cut milling, the machine uses cutters at the full speeds and feeds of which they are capable, lengthens cutter life and produces more accurate surfaces. In the Jerwag method, cutter edge begins to cut immediately upon making contact with the work. The bed can handle severe torque and torsional stresses. Working surface of table is 55x14 in. Range is 39.-370 in. longitudinal, 13,870 in. vertical, 5.906 in. cross. A drum controller provides 6 progressive speeds for milling spindle in direct drive, 6 additional through back gears. *Kurt Orban Co., Inc.*

For more data circle No. 19 on postcard, p. 97.



Piston gage checks critical diameters

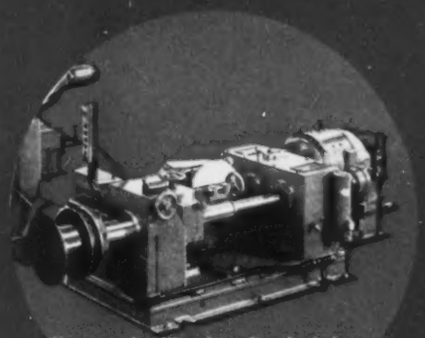
A fast, positive-operation multi-dimension gage measures all critical diameters of automotive and aircraft pistons in two simple operations. With the dual-measuring air plug in a vertical position the operator loads the piston and checks both ends of the wrist pin hole for ID, taper and bellmouth. The air plug is then rotated 180° to explore for out-of-round and other undesirable hole conditions. Slightest variation from a master setting is noted by Dual Dimensionair. All OD's are simultaneously inspected for out-of-tolerance by eight floating gage units. Red lights show oversize; amber, undersize. *Federal Products Corp.*

For more data circle No. 20 on postcard, p. 97.

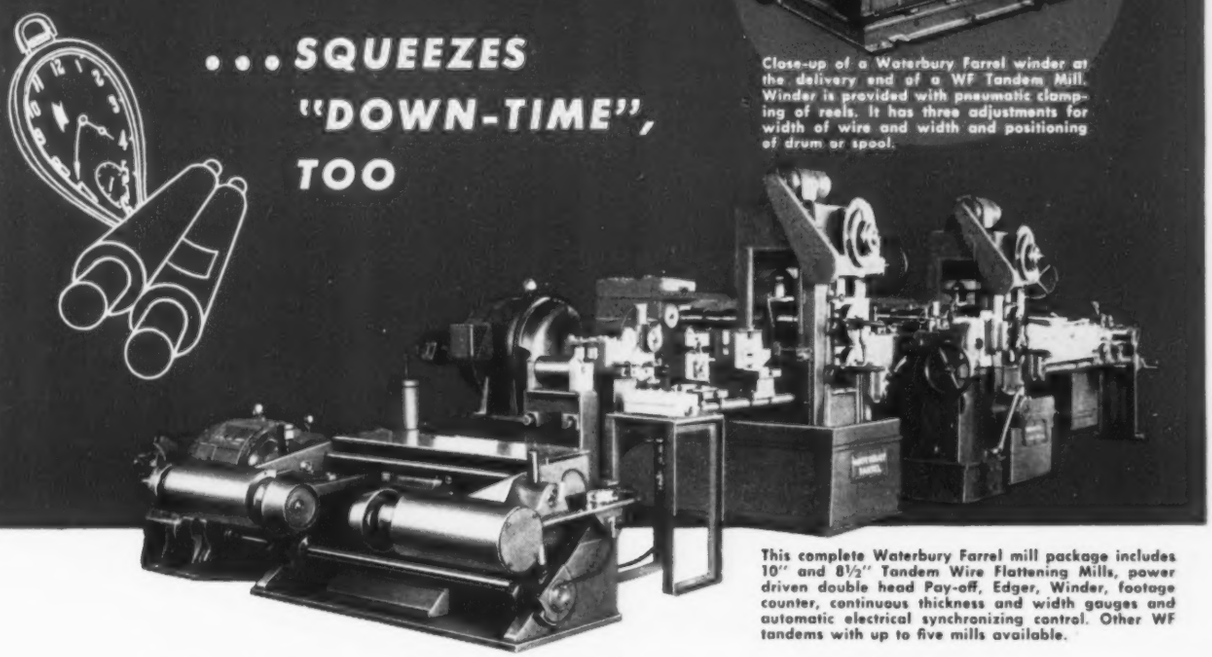
Turn Page

THIS WF WIRE FLATTENING TEAM

. . . SQUEEZES "DOWN-TIME", TOO



Close-up of a Waterbury Farrel winder at the delivery end of a WF Tandem Mill. Winder is provided with pneumatic clamping of reels. It has three adjustments for width of wire and width and positioning of drum or spool.



This complete Waterbury Farrel mill package includes 10" and 8½" Tandem Wire Flattening Mills, power driven double head Pay-off, Edger, Winder, footage counter, continuous thickness and width gauges and automatic electrical synchronizing control. Other WF tandems with up to five mills available.

Modern Waterbury Farrel Mill Design Insures High Production Plus Precision . . . Minimizes "Down-Time"

Here are some reasons why Waterbury Farrel Wire Flattening equipment can give you *more continuous*, high speed, precision production.

- Loading payoff and motor driven screwdowns for mills and edgers facilitate threading of wire with minimum effort and time.
- To protect precision operation, soluble oil is circulated internally and externally on the rolls and into coolant enclosures where wire is submerged. A refrigeration system maintains the coolant oil temperature at approximately 70° while a flotation unit keeps it clean and fresh. In addition, high speed mills also have a self-contained, automatically-filtered circulating mineral oil lubrication system for roll necks and drives.
- Transparent lucite covers at vital lubrication points such as gear cases and universal joints make it easy to check lubrication at a glance.
- Anti-friction bearings are used for all rotating members including the winder shaft. High precision anti-friction bearings are used on roll necks and edger arbors. This, combined with precision fitting of component parts enables WF mills to maintain tolerances well inside commercial allowance.
- Tungsten carbide ring rolls permit rolling the toughest alloys and increase roll life.
- Electric control keeps wire tension constant. Dancer rolls are used for fine wire.

Waterbury Farrel designs and builds a wide range of wire flattening mill equipment to suit specific requirements. Various sizes and combinations of single and multiple mill stands with auxiliary equipment are available for flattening ferrous and non-ferrous wire from the smallest diameters to 1" diameter and more. Speeds range up to and above 2500 FPM.

Write for further information.

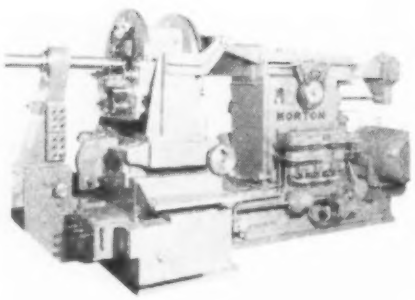
WATERBURY FARREL FOUNDRY & MACHINE CO.
WATERBURY 20, CONN.
Sales Offices: Chicago, Cleveland, Millburn, N. J.

WATERBURY FARREL FOUNDED 1851

A FEW OF THE MANY TYPES OF METAL WORKING MACHINERY MADE BY WATERBURY FARREL

MILL MACHINERY—Rolling Mills: Strip, Rod, Wire Flattening, (For Ferrous and Non Ferrous Metals) • Also Slitters • Straighteners • Cut-off Saws • Coilers • Winders, etc. *WIRE MILL EQUIPMENT*—Continuous Wire Drawing Machines (Upright Cone and Tandem) • Wire Flattening Mills • Chain Draw Benches • Pointers Swagers • Bull Blocks • String-up Machines • Spoolers, etc. *COLD PROCESS BOLT & NUT MACHINERY*—Headers (all types) • Rivet Machinery • Trimmers • Thread Rolling Machines • Slotters • Nut Formers and Tappers, etc. *POWER PRESSES*—Crank, Cam and Toggle; also Rack and Pinion Presses • Eyelet Machines Multiple Plunger Presses • Horizontal and Hydraulic Presses, etc.

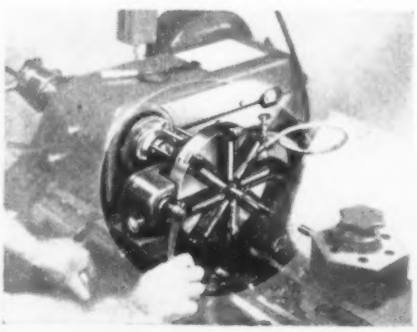
WF 9



Draw-cut shaper machines breech rings

This draw-cut shaper is designed for machining the rectangular tapered openings in forced or cast steel breech rings from 76 to 155 mm sizes. All controls are brought forward so the operator has clear view of his work at all times. The ram is reciprocated hydraulically and has capacity for removing heavy cuts at maximum feeds. A special cradle type fixture has both horizontal and vertical incremental feeds and power traverse. The breech ring is centered in a spool type chucking ring which when placed in the fixture can be rotated 180° and the fixture can tilt to the correct angle for establishing a proper taper. Breech can be completely rough machined without removal from fixture. *Morton Mfg. Co*

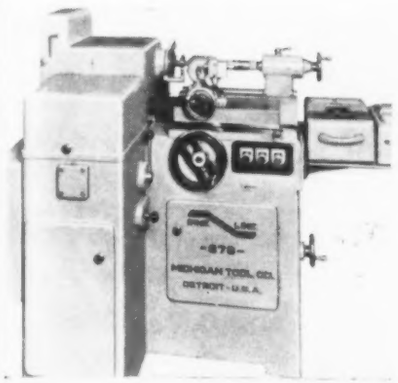
For more data circle No. 21 on postcard, p. 97.



New head increases small lathe production

The Roto Head has been introduced for multiplying small lathe production of duplicate parts. It fits any engine lathe between 9 and 12-in. swing and can be installed with no lathe alterations. The new accessory uses the principle of the Swiss type automatic machine—possessing eight different single point tools mounted in slidable, spring-loaded tool holders. Tool infeed is actuated by a hand crank. As the crank rotates the head automatically indexes to the next station. Two diameters are possible for each cutting bit. Sixteen different diameters can be produced on one job. *General Roto Co.*

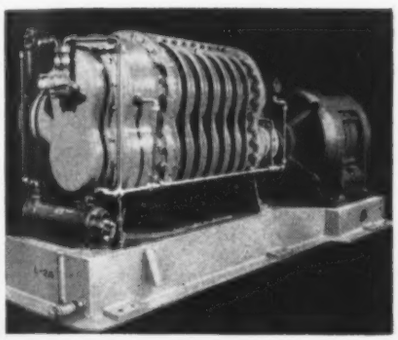
For more data circle No. 22 on postcard, p. 97.



Sine-line lead checker inspects hob, worm leads

In addition to inspecting leads on hobs and worms, the Model 876 sine-line lead checker will check hob flute spacing and thread spacing on multiple thread hobs. An auxiliary fixture can be mounted on the machine in place of the indicator head to check hob pressure angle. Automatic recording equipment can be provided to work in conjunction with the checking machine. In checking leads, the rotation of the hob or worm spindle and translation of the indicator table parallel to the hob spindle is effected by a sine bar table on the machine base. Index plates are used to check hob flute and thread spacing. Hob capacity ranges from ¼ to 8 in. diam. Spread of centers is 13 in. *Michigan Tool Co.*

For more data circle No. 23 on postcard, p. 97.



Compressor employs intermeshing screw rotors

A gas or air compressor called the Spiraxial Compressor is new in principle and design within its range. Instead of conventional rotors, the compressor employs two intermeshing screw rotors which rotate in opposite directions. These screws are operated by gears synchronized to prevent contact, allowing close but definite clearances between them. The flow of air or gas is axial, with most of the compression taking place at the back of the casing. This allows a large inlet opening, preventing strangulation of air and increasing volumetric efficiency. *Roots-Connersville Blower.*

For more data circle No. 24 on postcard, p. 97.

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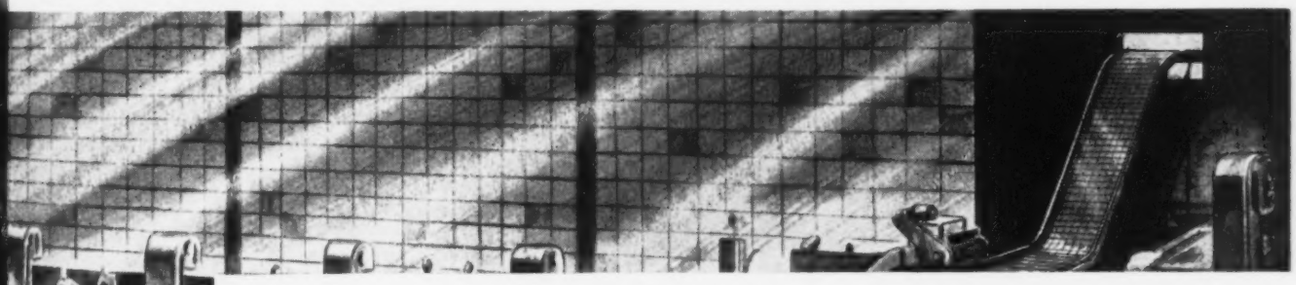

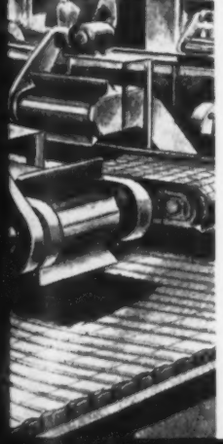

. . . speed-up production

For full utilization of vital machinery and skilled manpower, mechanize your scrap handling. MAY-FRAN automatic systems increase production by eliminating machine downtime for scrap removal and end manual lifting and hauling.

Whether your scrap volume is large or small, MAY-FRAN can design and install an automatic handling system to meet your needs. Hot, wet or highly abrasive chips, turnings and borings can be removed continuously from operating machine tools by CHIP-TOTE conveyors and transported to disposal point on MAY-FRAN hinged-steel belting.

Leader in automatic scrap handling systems, MAY-FRAN has the technical skill and experience to solve your scrap handling problems. Write today for illustrated catalog.

699-MF

ENGINEERING, INCORPORATED

1698 CLARKSTONE ROAD • CLEVELAND 12, OHIO

SPECS FOR NON-FERROUS FINISHING GOT YOU DOWN?

FIND OUT ABOUT **IRIDITE** TODAY for finishing ZINC, CADMIUM, ALUMINUM, CUPROUS METALS

WANT CORROSION RESISTANCE? Iridite will give you better-than-specification protection against corrosion.

WANT PAINT ADHERENCE? Iridite provides a firm and lasting base for paint by preventing under-film corrosion.

WANT EYE-APPEAL? Iridite can give you a variety of finishes, depending upon the metal being finished . . . from clear and sparkling bright or military olive drab, to attractive dyed colors.

BEST OF ALL, any Iridite finish is economical and easy to apply.

for example: **IRIDITE**® (AL-COAT) REDUCES NEED FOR ANODIZING

Simple chemical dip; immersion time only 10 seconds to 2 minutes; no sealing dip; color is clear or yellow depending upon your requirements; salt spray resistance equivalent to 20 to 30 minutes of anodizing, eliminates need for costly racks and electrical power.

WANT TO KNOW MORE? Write for literature and send production samples for free test processing. See "Plating Supplies" in your classified telephone directory or write direct.

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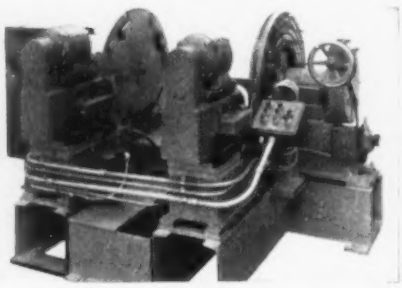
Manufacturers of Iridite Finishes for Corrosion Protection and Paint Systems on Non-Ferrous Metals; ARP Plating Brighteners.
West Coast Licensee: L. H. BUTCHER COMPANY

New Equipment

Continued



Milling machine

This special milling machine was designed to mill the inside flange faces on jet housings. Automatic air cylinders are used for clamping the housing against holding faces, and each milling head automatically oscillates in and out six times within the machining process, to clear outside ribs. *Pioneer Tool & Engineering Co.*

For more data circle No. 25 on postcard, p. 97.

Electric drills

Two new electric hand drills, a general duty type with ¼ in. chuck and a ½ in. capacity special duty mold, are a composite of popular drill features selected in a survey of drill users. Both models have spindle ball-bearing construction to absorb radial load and end thrust, Jacobs gear-type chucks for slip-proof gripping of bits, and powerful Universal motors. Housings are satin finished diecast aluminum with aircool vents located to avoid covering by hand. *Porter-Cable Machine Co.*

For more data circle No. 26 on postcard, p. 97.

Condensate stopped

Atmospheric condensation affecting items in storage can be avoided by an automatic control system that keeps the temperature of the stored material above the dew point of the air. The controller takes this corrective action before moisture conditions develop. It measures the air temperature and the dew point of the air. When the temperature of the material approaches the dew point, the instrument positions valves in the heating system to prevent moisture formation. *Foxboro Co.*

For more data circle No. 27 on postcard, p. 97.

Powdered metal gears

Bevel gears made of an iron or steel base have high tensile strengths to provide excellent wearing qualities. When desired, they can be impregnated with oil, said to result in a marked reduction in noise when compared with steel gears. Because of the manufacturing processes involved, these powdered metal gears are said to be extremely accurate. At the present time, they are being manufactured on a contract basis only, in sizes from the smallest to 4 in. OD. *Michigan Powdered Metal Products Co.*

For more data circle No. 28 on postcard, p. 97.

Miniature stop nuts

For specialized applications, particularly in the electronics and instrumentation fields, a new line of miniature hexagonal stop nuts, as small as 0.109 in. across flats will be available in brass and aluminum. Nylon locking insert maintains a constant and highly reuseable grip on the screw threads, unaffected by vibration. *Elastic Stop Nut Corp. of America.*

For more data circle No. 29 on postcard, p. 97.

Small parts degreaser

New semi-portable degreaser is designed to clean small and medium sized parts. Two standard, manually operated models are available: one electrically heated, the other steam operated. Parts are suspended in pure solvent vapor which rapidly dissolves soils of dirt and grease. A spray of hot solvent flushes any loose, stubborn soils which might remain. Finally, a rinse in pure solvent vapor leaves the work thoroughly clean and dry. *Detrex Corp.*

For more data circle No. 30 on postcard, p. 97.

Turn Page

WELDMENTS
CAN SAVE YOU MONEY!

Acme weldments are replacing castings for leading machinery and equipment manufacturers everywhere because they do a better job at lower cost. Experienced Acme engineers at work with Acme's complete fabrication facilities can give *you* these same advantages . . . Acme's new 24-page, illustrated booklet shows you why. *The Facts about Weldments and Castings* tells you what you should know about their relative strength, rigidity, vibration, design flexibility, and cost . . . facts to help you specify and save. And it's yours for the asking . .

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TANK and WELDING
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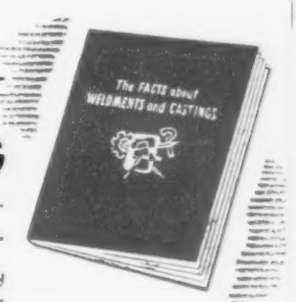
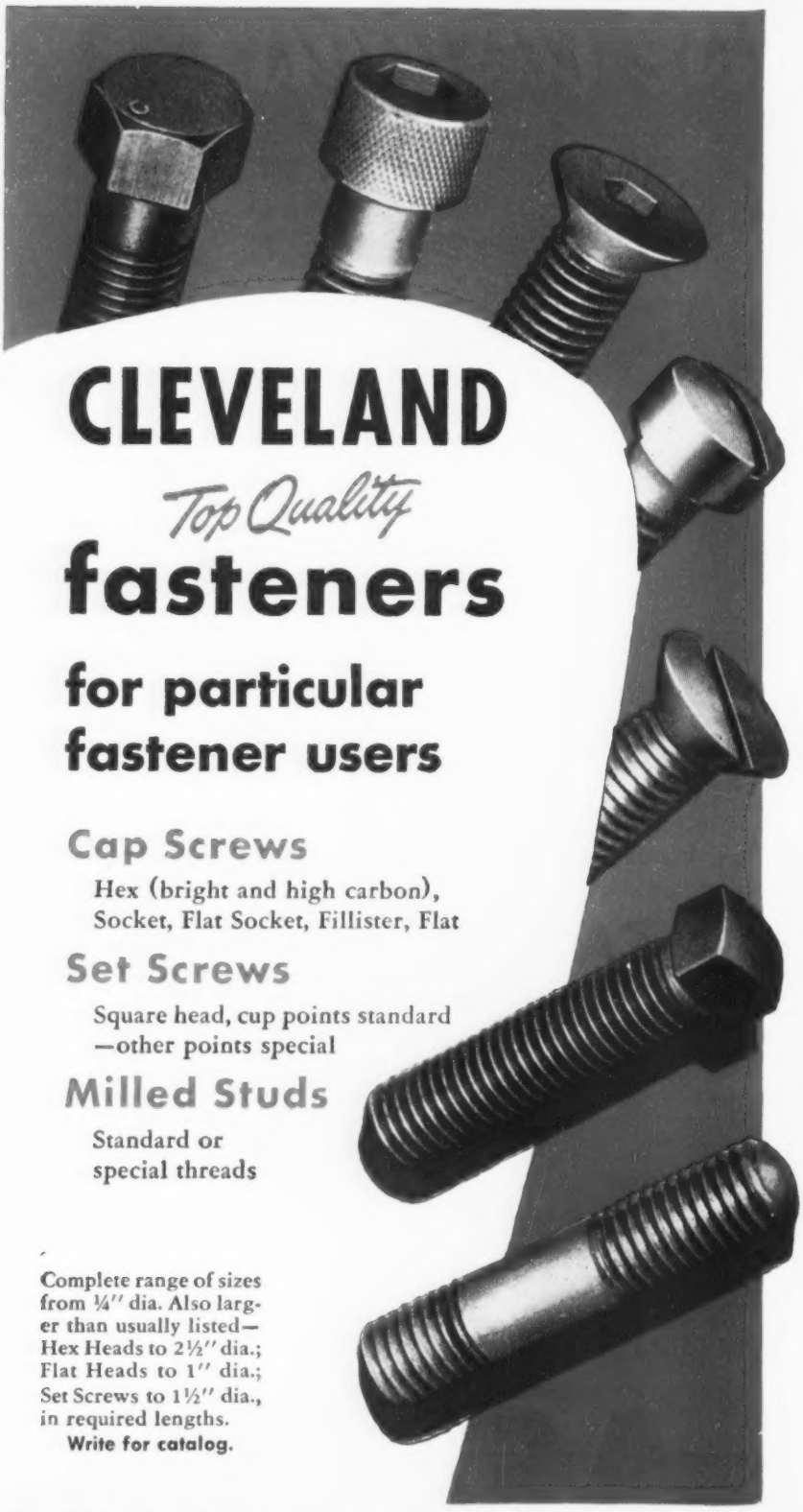


- A.S.M.E. Qualified Welders • National Board Approved
- Hartford Steam Boiler Inspection Service • A.P.I. Approved
- Underwriters Label and Inspection Service • Navy Approved

Write for yours TODAY!



CLEVELAND

Top Quality

fasteners

for particular fastener users

Cap Screws

Hex (bright and high carbon), Socket, Flat Socket, Fillister, Flat

Set Screws

Square head, cup points standard —other points special

Milled Studs

Standard or special threads

Complete range of sizes from ¼" dia. Also larger than usually listed—Hex Heads to 2½" dia.; Flat Heads to 1" dia.; Set Screws to 1½" dia., in required lengths.

Write for catalog.

CLEVELAND *Top Quality* FASTENERS

THE CLEVELAND CAP SCREW COMPANY

2917 East 79th Street, Cleveland 4, Ohio

Warehouses: Chicago • Philadelphia • New York • Providence

originators of the Kaufman DOUBLE EXTRUSION Process

Ask your jobber for Cleveland Fasteners

Production inspection

The new projection angle Dekkor is a rapid inspection device that quickly checks squareness of holes to reference surfaces, parallelism of two or more bores, parallelism of two or more planes, and has numerous other applications. It is an auto-collimating unit that shows on a projection screen direct readings of squareness of a reflecting surface placed into the path of its light. A number of surfaces can be inspected simultaneously to determine their parallelism to each other. *Engis Equipment Co.*

For more data circle No. 31 on postcard, p. 97.

Stainless steel tanks

Chemical mixing and storage tanks of stainless steel feature an inverted air-seal cover that fits closely against the sides of the round tank and actually floats on top of its contents. Covers are made of transparent, chemically inert resin, making it possible to check contents at all times. *Reco Sales Co.*

For more data circle No. 32 on postcard, p. 97.

Coil grab

Two new coil grab models have 5000-lb capacity. One is designed for normal width coils up to 12 in. wide, the second for coils to 24 in. wide. In one easy motion, an operator can lift the coil from pallet to vertical position, or can pickup coils from vertical position and lay them on a pallet. A safety lock maintains a positive grip on the coil at all times. *Dixon Automatic Tool, Inc.*

For more data circle No. 33 on postcard, p. 97.

Tapping attachment

Auto-tap is a lead screw tapping attachment having a variety of split nuts and matching lead screws that are available in different pitches to suit a wide range of tapping requirements. The unit attaches to a standard drill press by an arm; lead screw and nut through which it passes controls the drive of the tap. Auto-tap is held in the chuck of a reversing head, providing fool proof means of tapping perfect threads. *Automatic Methods, Inc.*

For more data circle No. 34 on postcard, p. 97.

Ball-tip gloves

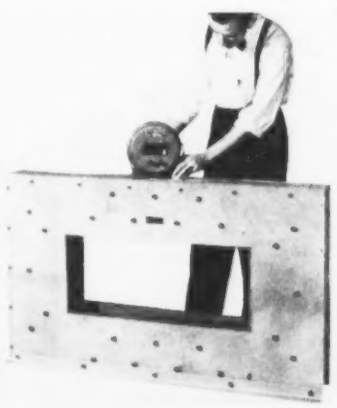
Protection against crushing for all four fingers of a worker's hand is provided by new ball-tip gloves. Extra-long leather fingers have a ⅝-in. steel ball stitched securely into the end of each finger. *Boss Mfg. Co.*

For more data circle No. 35 on postcard, p. 97.

New reactor

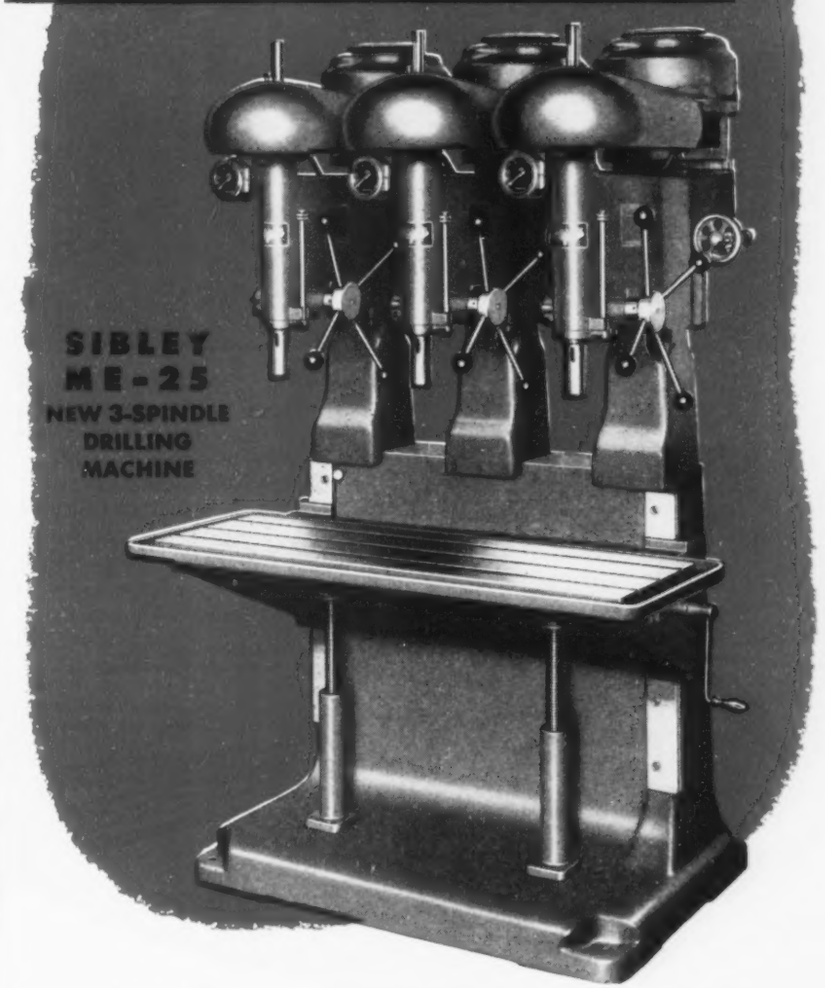
Dc current-measuring reactor safely measures dc current up to 120,000 amp and provides an isolated signal proportional to the dc bus current with a normal accuracy of ± 2 pct. It is available in standard models up to 10,000 amp and on special order up to 120,000 amp. Cased in a shell of glass-reinforced polyester resin, the equipment slips in place over the dc bus and does not require the bus be broken or that bolted connections be made at the point of measurement. *General Electric Co.*

For more data circle No. 36 on postcard, p. 97.



Turn Page

Cut Work Handling



Work-handling consumes more time than work-cutting in producing many jobs. Reducing manual effort by one-half may increase production more than by faster cutting speeds. To make this improvement without burdening the operator —in fact to make it easier for him—is the chief advantage of the new Sibley Model ME-25.

The variable speed drive, the big 21½" swing, the extra large table, the convenient speed controls, the handy tachometers, all combine to make this 1" capacity, medium weight machine a production advantage in any shop!

SIBLEY
MACHINE & FOUNDRY CORP.
SOUTH BEND 23, INDIANA

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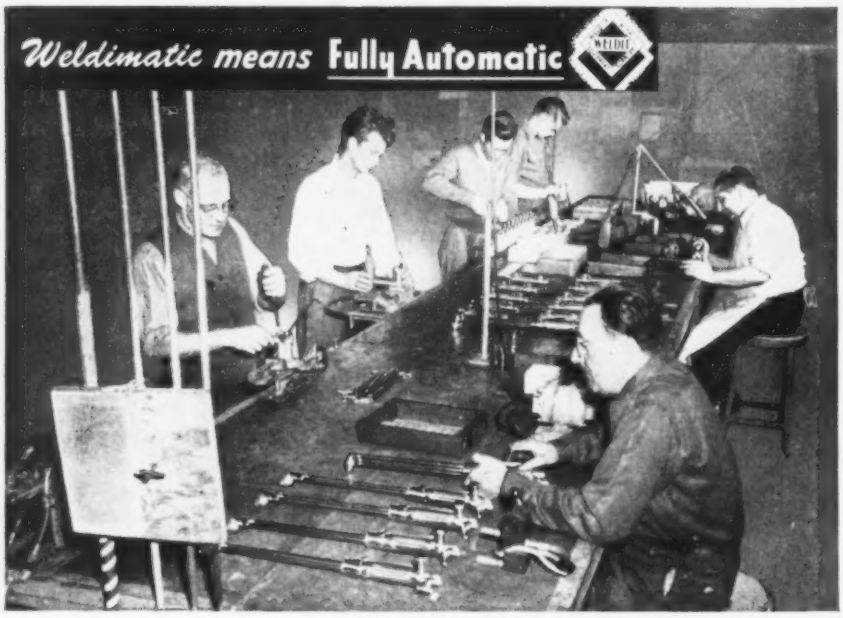


Loyalty to a Principle!

When the late Otis L. Smith founded Weldit, Inc., in 1918, he was determined that the basic policy of the new company would be to produce the finest precision welding products in the world. This policy throughout the years has become an inheritant part of every Weldit product. This loyalty to a principle has made Weldit torches synonymous with quality throughout industry.

Weldit *Weldimatic* torches will do a better job . . . faster . . . at less cost than any other torch.

Weldimatic natural action!
To light—squeeze, to shut off—release grip.

Illustrated, WELDIT Model W-46 *Weldimatic* Welding Torch.

Weldit INC. SINCE 1918

A limited number of Weldit Dealer franchises available.

992 OAKMAN BOULEVARD, DETROIT 6, MICHIGAN

CANADIAN DISTRIBUTORS—ALLOY METAL SALES—181 Fleet St., E., Toronto 5, Ontario, Canada

How To Reach Them

The thousands of purchasing executives, production chiefs, and engineers, all potential BUYERS of your products are among the readers of Iron Age. Your advertisement here can pave the way for your salesmen throughout the metalworking industry.

For information write:

the Iron Age 100 E. 42nd St., NEW YORK 17, N. Y.

—New Equipment—

Continued

Smoke indicator

Fireye photoelectric smoke indicator series FE provides a simple and direct method of maintaining a continuous check on overall combustion efficiency. Its light source and scanner are mounted on the opposite sides of the stack or breeching and indicator is placed at any convenient location, such as on a control panel. As smoke in the breeching passes through the light beam, the indicator shows smoke density reading in Ringelmann numbers and percent of density. *Combustion Control Corp.*

For more data circle No. 37 on postcard, p. 97.

Sand blaster

An important feature of a new sand blaster is a nozzle that is said to speed sand blasting of paint, rust or scale by 25 pct over previous methods. The blast nozzle has venturi profile which achieves higher blasting efficiency by eliminating throat choking and muzzle turbulence that ordinarily dissipate the force of abrasive action. The air blast can reach supersonic velocities, increasing the grit speed to give more rapid and efficient cutting on the work surface. The portable unit comes in three sizes ranging from 125 to 1000 lb sand capacity. *Vacu-Blast Co., Inc.*

For more data circle No. 38 on postcard, p. 97.

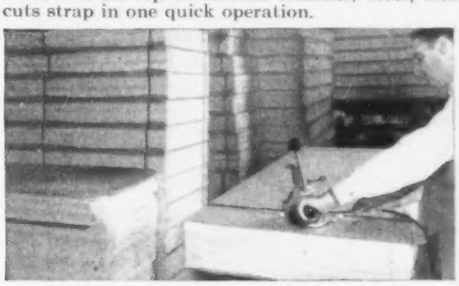
Turn Page

Acme Steel Strapping Insures S.A. *(Safe Arrival)*

Reduces shipping cost, saves time and material, too!

OVER A MILLION HOTPOINT ELECTRIC RANGES have been prepared for shipment with an Acme Steel pneumatic stretcher and pre-cut Acme Steel strapping shown being applied above. This practice has held shipping preparation costs as much as 20 per cent below normal appliance industry shipping costs and has eliminated a serious bottleneck while making the job easier.

PLASTIC TABLEWARE SETS FROM THE WEST COAST are readied for shipment across the U. S. A. Acme Steel tool on top of cartons tensions, seals, and cuts strap in one quick operation.

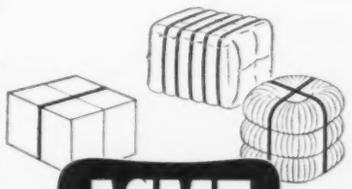


SCREEN DOORS FROM MILWAUKEE can be shipped to markets anywhere protected with Acme Steel strapping. Half-a-dozen doors bound in this way give a pack of remarkable strength and saves labor as well.

Whatever you ship, from kitchen ranges to screen doors, chances are you can reduce shipping damage by securing with Acme Steel strapping.

The fact is that nearly everything made for any purpose anywhere, depends on steel strapping to insure Safe Arrival during its journey to the user.

But Safe Arrival is only part of the story. In case after case packing, loading, and shipping costs have been lowered—production assembly lines have been speeded up with Acme Steel strapping. Many striking examples are available. Write for them to Acme Steel Products Division, Dept. IA-112.



ACME STEEL

ACME STEEL COMPANY
2825 Archer Avenue, Chicago 8, Illinois

"Joe, getting small metal parts with precision tolerances is always a problem."

"Not when we have Torrington make them, Tom. Their production methods and facilities are among the finest in the world."

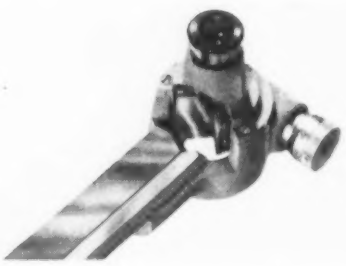
The methods used by our Specialty Department in the production of precision metal parts are the result of over 86 years of constant effort to decrease the cost and improve the quality of our own products. Most operations are performed on automatic and semi-automatic machines – many of them Torrington-designed – that assure uniform quality and precision. The latest heat-treating and finishing practices give proper temper and hardness. And mass-production techniques make possible the greatest possible economy on any quantity of small metal components.

If *you* need precision metal parts, ask us for a quotation. Just send us a blueprint or sample and tell us how many you need. The low cost will surprise you!

THE TORRINGTON COMPANY
Specialty Department
555 Field Street • Torrington, Conn.
Makers of
TORRINGTON NEEDLE BEARINGS

New Equipment

Continued



Drill point gage

With a simple hand tool, new drills and resharpened drills can be inspected in a matter of seconds to make certain that drill lips have been ground to equal angles and equal lengths. The drill Point-Chek assures more accurate drilling and longer tool life. Error in angles is determined accurately by a micrometer barrel graduated in degrees. *F. T. Griswold Mfg. Co.*

For more data circle No. 39 on postcard, p. 97.

One-man truck

The ability to carry long, heavy materials down narrow 10-ft aisles and through narrow doorways as well as the ability to load, stack and travel in 10-ft aisles are the chief advantages of the Traveloader. The tower is hydraulically controlled and moves out to the side of the machine, picks up a load and then moves in, placing the load

on the decks. It lifts materials to 12 ft heights and is capable of tilting forward or back to discharge or secure a load. Other tower attachments include twin crane hooks, master pallets, a ram attachment and special 60-in. material handling forks. Top speed of the unit is approximately 30 mph. Units are available in 5000, 10,000, 15,000-lb capacities. *Lull Mfg. Co.*

For more data circle No. 40 on postcard, p. 97.

for a tighter hold

Torrington Swaging Machines offer an ideal method of attaching ferrules and cable ends to wire or rod. Rapid hammer blows (4000 a minute) tighten the ferrule quickly around the rod – producing a bond that withstands as much tensile strain as the inner member alone.

"The Torrington Swaging Machine" tells you how to do a better job of shaping many metal parts, and save money, too. It also describes the complete line of Torrington machines. Write for your free copy...today!

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Swager Department
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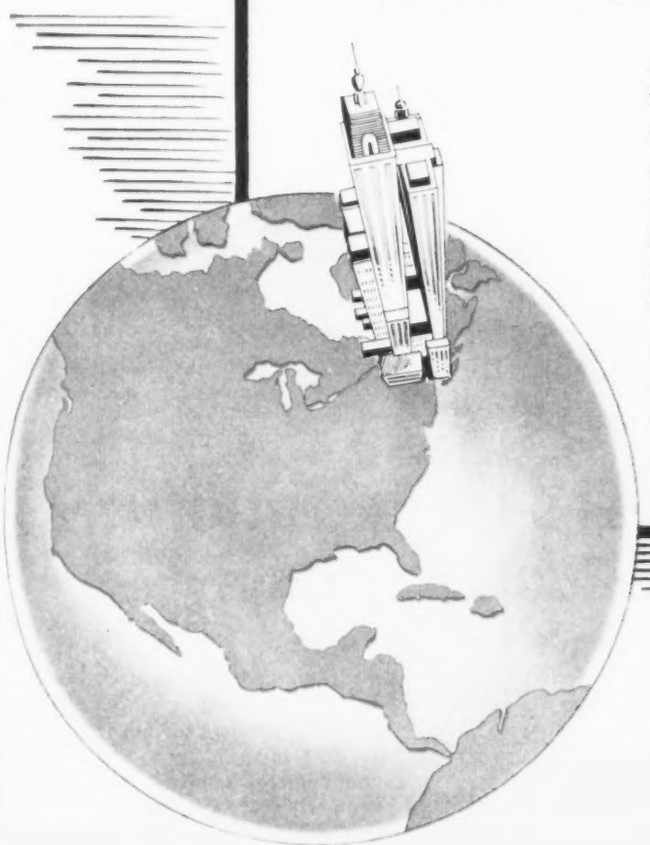
Makers of
TORRINGTON NEEDLE BEARINGS

Since 1850

WE HAVE PRODUCED ENOUGH IRON ORE TO MAKE THE STEEL TO BUILD A CITY THE SIZE OF NEW YORK:—



. . . During our first century we have furnished the steel makers of America with considerably more than two hundred million tons of high grade iron ores. The many years in which we have produced and shipped these ores have given us a reputation of reliability and integrity.

In the second century we will not rest on our laurels, but will continually strive to improve the quality of our ores, coals and lake transportation.

CCC

The Cleveland-Cliffs Iron Company

UNION COMMERCE BUILDING • CLEVELAND 14, OHIO

OSBORN

OSBORN ROTA-LIFT STEPS UP PRODUCTION from 20 to 90 molds per day

Saves one operator By installing Osborn's Rota-Lift, this foundry has increased mold output per manhour nine times. Formerly one molder and one helper produced only 20 molds per day. Now one man and no helper turns out 90 molds a day with the same pattern equipment. Molds are uniform, high quality throughout the day. Heavy physical effort has been eliminated.

Perhaps savings like these can be duplicated in your shop with Osborn's advanced molding methods. Have a factory-trained representative survey your requirements. From Osborn's complete line of molding machines and core blowers, he can recommend the most modern, efficient molding method for your particular operation. Write *The Osborn Manufacturing Company, Dept. 882, 5401 Hamilton Avenue, Cleveland 14, Ohio.*

Serving the Foundry Industry for Over 43 Years

Osborn Molding Machines

MOLDING MACHINES...CORE BLOWING MACHINES...INDUSTRIAL BRUSHES

The Iron Age

SALUTES

Kenneth T. Norris

Starting during the depression, this Coast metalworker succeeded through hard work and versatility.

THINK of almost any drawn metal product from kitchen sinks to cartridge cases—and Kenneth T. Norris is making it. The 53-year-old president of Norris-Thermador Corp., Los Angeles, launched the original Norris Stamping and Manufacturing Co. in 1930—at the bottom of the depression. In 22 years of hard work the present Norris-Thermador has blossomed into one of the leaders in its field and "K. T.'s" working day has dwindled to only 9 hr.

K. T. went to California from his native East St. Louis, Ill., at the age of eight with his parents who started a general store in the San Joaquin Valley. He worked for the Kittle Mfg. Co. of Los Angeles for 10 years, leaving it in 1920 as assistant general manager to establish Norris Stamping.

One of the West's few shell manufacturers, he is chairman of both the Cartridge Case Committee of the American Ordnance Assn. and Ordnance Advisory Committee of the National Security Industrial Assn.

He has also been president of the California Manufacturers Assn., and a director of the National Assn. of Manufacturers, the Merchants and Manufacturers Assn. (Los Angeles) and local Chamber of Commerce. He also spends more than his share of time and dollars on civic organizations.

This year "K. T." finally took his first full fledged vacation—but worked on that too. He visited England, Holland, Germany, Italy, France and Switzerland, taking more than 800 color photos—but saw all the big factories in those countries while he was at it.

No Pressure Wipe-Off on Gears Lubricated with Sun 897 Grease

Even heavy tooth loading won't cause Sun 897 Adhesive Pressure Grease to squeeze out. It stays on the gears, prevents metal to metal contact, prolongs gear life, and reduces lubrication costs. Sun 897 is most valuable where *throw-off* with resultant wear and spotting of products must be avoided. It is easily applied with a brush on open gears, sprockets, chains, slides, cams, cables, couplings and linkages. For complete information, consult your nearest Sun representative or write Department IA-11.

SUN INDUSTRIAL PRODUCTS
SUN OIL COMPANY • PHILADELPHIA 3, PA.
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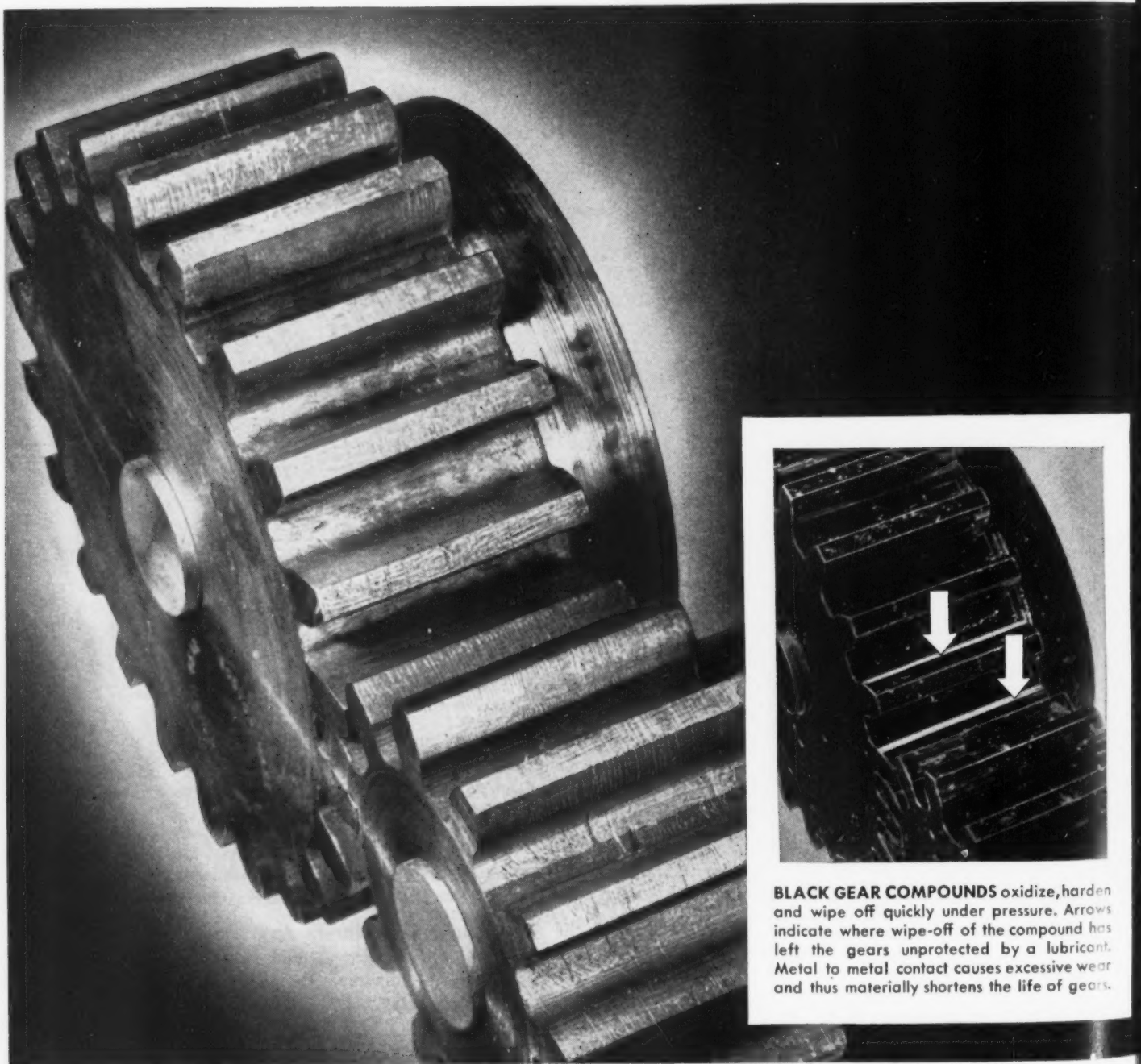


BLACK GEAR COMPOUNDS oxidize, harden and wipe off quickly under pressure. Arrows indicate where wipe-off of the compound has left the gears unprotected by a lubricant. Metal to metal contact causes excessive wear and thus materially shortens the life of gears.

NO SQUEEZE-OUT due to pressure. A thin, transparent film of Sun 897 Adhesive Pressure Grease stays evenly distributed on the gears and gives positive lubrication at all times. Sun 897 is water resistant and can be easily applied with a brush.

The Iron Age INTRODUCES

Ronald D. Gumbert, appointed executive vice-president, ALLY PRECISION CASTINGS CO., Cleveland.

Harold Camp, elected to newly-created position of vice-president in charge of finance, PITNEY-BOWES, INC., Stamford, Conn.

L. J. Call, Jr., appointed chief draftsman, HOOKER ELECTROCHEMICAL CO., Niagara Falls, N. Y.

John A. Swint, appointed general manager, Tank Div., FORD MOTOR CO., at Livonia, Mich. He succeeds **A. C. Moore,** who has been named general manufacturing manager, Aircraft Engine Div. at Chicago.

Theodore Ulrich, named chief engineer in charge of body and styling activities, Nash Div., NASH-KELVINATOR CORP., Detroit; **W. S. Berry,** appointed chief mechanical engineer; and **William Christensen,** becomes assistant to vice-president in charge of research.

Robert Bigham and **Jack R. Clemens,** appointed project engineers, T. A. B. ENGINEERS, INC., Chicago.

W. P. Fitz-Randolph, appointed New England sales engineer, IPSEN INDUSTRIES, INC., Rockford, Ill.

Henry K. Moore, appointed field engineer, Southern Philadelphia territory, THE BELLOWS CO.

Cyrus Stonehill, appointed sales manager newly created Ballast Dept., in Ipswich, Mass., of SYLVANIA ELECTRIC PRODUCTS, INC.

Brent C. Jacob, Jr., appointed supervisor of Quality Inspection, CHRYSLER CORP., Detroit.

Wilson R. Coffman, made industrial manager, Wichita branch office, MINNEAPOLIS-HONEYWELL REGULATOR CO., and **James E. Vanderveld,** appointed industrial sales manager, Portland, Me., office.

Roy S. Garman, appointed director of cost planning and budgetary control, BLAW-KNOX CO., Pittsburgh.

J. H. Frankfort, appointed chief project engineer, WALTER KIDDE NUCLEAR LABORATORIES, New York.

Richard D. Tyler, appointed manager of marketing, GENERAL ELECTRIC CO., and **Thomas J. Kelly,** appointed manager of engineering, Appliance Control Dept. at Morrison, Ill.

D. M. Schmid, appointed assistant general manager of sales, Truscon Steel Div., REPUBLIC STEEL CORP., Youngstown; and **C. L. Spatholt,** made manager of sales, reinforcing products.

W. Harrison Lackey, appointed manager of plate sales, LUKENS STEEL CO., Coatesville, Pa.

Roger M. Bury, appointed sales promotion manager, INTERNATIONAL BUSINESS MACHINES CORP., New York.

Ralph H. Stroth, appointed Indianapolis district manager, CHASE BRASS & COPPER CO., INC., Waterbury, Conn.

Harold C. Olson, named works metallurgist, Los Angeles plant, LINDBERG STEEL TREATING CO.

John R. Howland, named to newly-created position of commercial sales manager, STEWART-WARNER ELECTRIC CORP., Chicago.

James M. Wallace, named manager, newly-formed Industrial Relations Dept., Aviation Gas Turbine Div., WESTINGHOUSE ELECTRIC CORP., South Philadelphia, Pa.

Paul A. Stewart, appointed to the newly created position of production manager, THE MAYTAG CO., Newton, Iowa.

WILLIAM L. KILLEN, named general manager, Chicago Steel Tank Div., Pressed Steel Car Co.

JAMES M. MEAD, elected assistant vice-president, Joseph T. Ryerson & Son, Inc., Chicago.

JAMES E. PIERCE, appointed assistant manager of sales, Hot Rolled Products, Jones & Laughlin Steel Corp., Pittsburgh.

IF YOU NEED
Yoloy

rely on VIKING

complete stocks of YOLOY PLATE, BAR SIZE ANGLES, HOT ROLLED SHEETS 10 TO 14 GAGE INCLUSIVE. COLD ROLLED SHEETS 16 TO 22 GAGE INCLUSIVE.

- COLD FINISHED BARS
- ALLOY COLD FINISHED BARS
- HOT ROLLED BARS
- STRUCTURALS
- HOT ROLLED PLATES
- ABRASION RESISTING PLATE
- HOT ROLLED AND COLD ROLLED SHEETS
- HOT ROLLED STRIP
- DEFORMED REINFORCING BARS
- YOLOY PRODUCTS
- SOFT BLACK ANNEALED WIRE
- BRIGHT BASIC WIRE AND WIRE RODS
- WIRE ROPE AND FITTINGS
- WELDED WIRE MESH

VIKING
STEEL COMPANY
16700 St. Clair Ave.
CLEVELAND 10, OHIO

1003 Fisher Bldg., Detroit 2, Mich.

Personnel

Continued

Ralph Rathyen, appointed manager, Crucible & Refractories Div., JOSEPH DIXON CRUCIBLE CO., Jersey City, N. J.

Aaron Evans, named Detroit sales manager, RUSSELL, BURDSALL & WARD BOLT AND NUT CO., Port Chester, N. Y.; and **Lambert M. Kaspers**, appointed manager. Coraopolis, Pa., plant.

Edson E. Foster, appointed advertising and sales promotion manager, CHASE BAG CO., Chicago.

Louis G. Raiche, appointed works manager, St. Charles, Mo., plant, AMERICAN CAR & FOUNDRY CO.

John J. Carr, joined sales force, Philadelphia branch, BULLDOG ELECTRIC PRODUCTS CO.

Thomas F. MacLaren, appointed representative, Chicago office, BROWN & SHARPE MFG. CO., Providence. He succeeds **Howard K. Jackson**, who has been given special assignments by the home office.

J. E. Watson, appointed representative in charge of Miami office, General Machinery Div.. ALLIS-CHALMERS MFG. CO.

Arthur B. Kowalski, named factory manager, MICROMATIC HONE CORP., Detroit; and **Joseph Bolz** and **Glenn Rosene**, appointed division superintendents.

William C. McConnell, becomes head of a-c motor sales in Cleveland, RELIANCE ELECTRIC & ENGINEERING CO.; **Robert B. Reed**, appointed sales engineer in Detroit; and **Rex T. Willard**, named sales engineer, Birmingham.

G. Jewett Crites, named manager, Vacuum Furnace Dept., F. J. STOKES MACHINE CO., Philadelphia.

Anthony F. Deegan, made manager of the Memphis warehouse, SOUTHERN STATES IRON ROOFING CO., succeeding **Marion L. Peek**, who was transferred to Savannah, Ga., and promoted to warehouse supervisor.

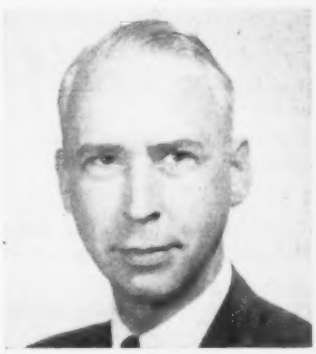
Marvin E. Straub, appointed assistant to the president in charge of steel procurement, ELLIMAN STEEL CO., Detroit.

Sigmund Toth, appointed shop superintendent, BEATTY MACHINE & MFG. CO., Hammond, Ind., and **John Borkert**, named chief engineer.

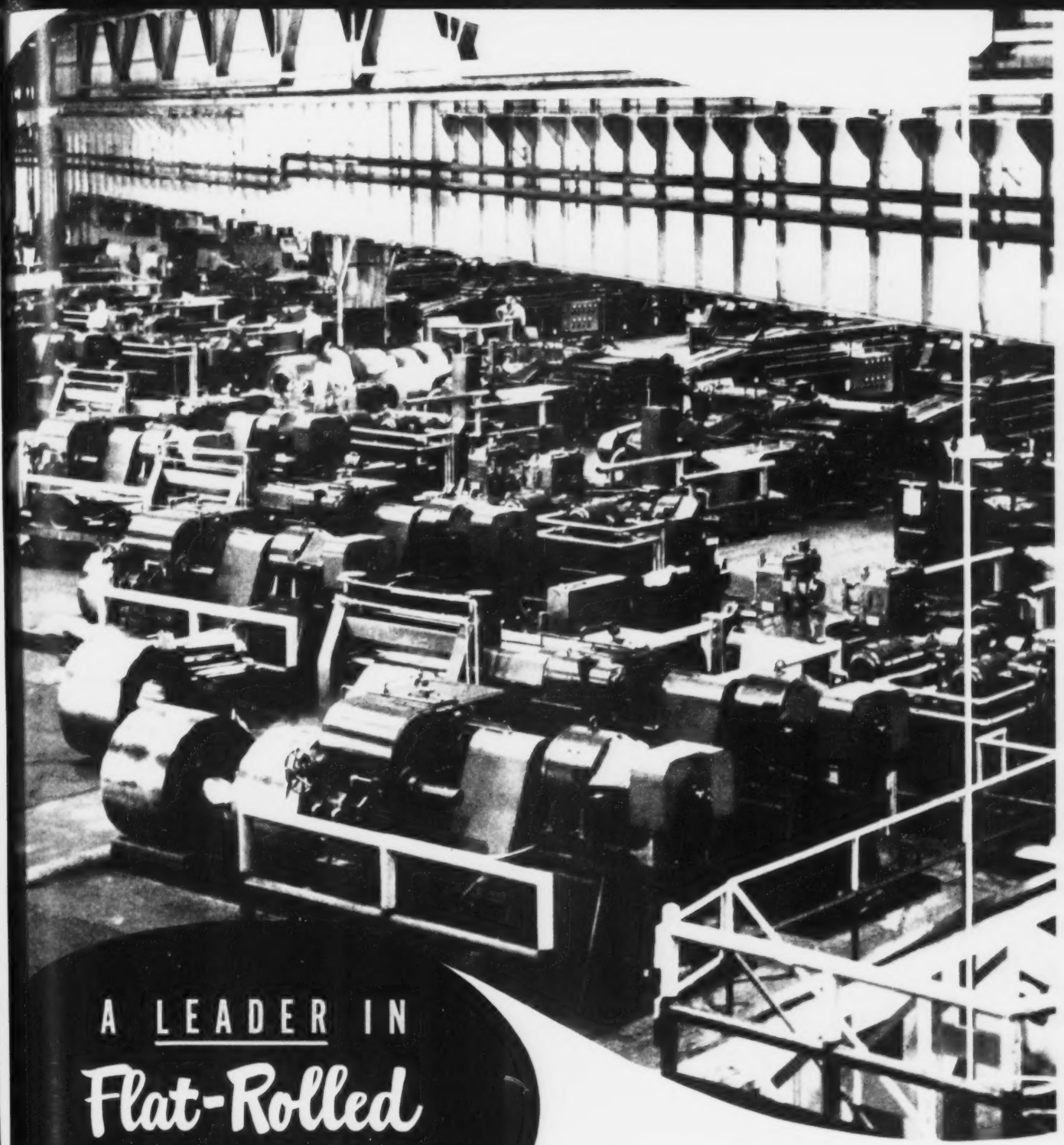
WILLIAM J. PINKERTON, appointed vice-president in charge of manufacturing, Micromatic Hone Corp., Detroit.

H. E. EHLERS, JR., promoted to assistant general sales manager, Joseph Dixon Crucible Co.

JAMES H. BALDREY, appointed supervisor of melting, The Cooper Alloy Foundry Co., Hillside, N. J.



GEORGE PETERSON, JR., appointed director of aircraft sales, Camden Forge Co., Camden, N. J.



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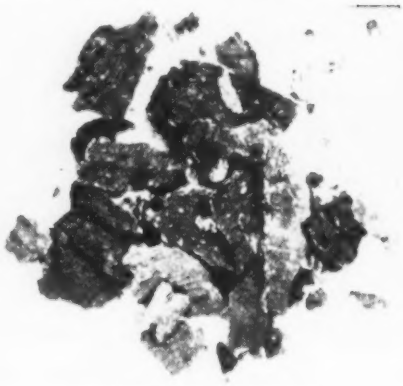
ZORBALL



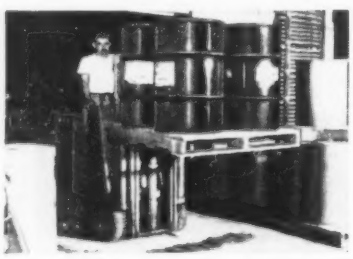
COMPETITIVE PRODUCT

Wet absorbents after 2 hours' heavy traffic

NOTE: Zorball still granular! Continues to be *nonskid, safe, still usable. Easily* swept from floor with ordinary brush!

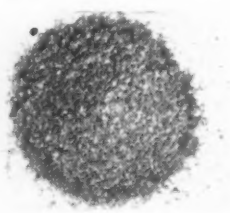
Competitive product is slippery, caked mud! Very dangerous, difficult to remove. *Metal scraper* needed to remove this sample!

POSITIVE PROOF! Zorball is the safest, lowest-cost floor absorbent known!



Test samples of Wyandotte Zorball and a well-known competitive absorbent sold for all-purpose use were placed in this busy runway. For 2 hours heavy trucks pounded over them. Results shown above and below.

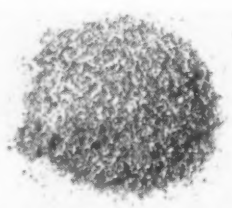
These pictures are proof that Wyandotte Zorball is the *safest* floor absorbent because it *resists breakdown*, retains nonskid properties as long as it's on the floor. This long life makes it the *lowest-cost* absorbent, too: *less* Zorball is required to do the job! Your Wyandotte representative can prove this by demonstration on your floors. Call him today. *Wyandotte Chemicals Corporation, Wyandotte, Michigan; also Los Angeles 12, California.*



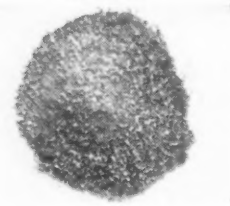
ZORBALL

ABSORBENTS BEFORE USE

Most absorbents look good when first put down. Both products were screened for these tests and the coarser particles used.



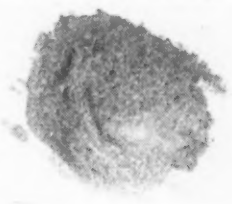
COMPETITIVE PRODUCT



DRY ABSORBENTS AFTER 2 HOURS' HEAVY TRAFFIC

ZORBALL, left, still granular. Retains nonskid properties!

Competitive product, right, is powdered dust. Has lost nonskid properties completely!



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—Personnel—

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John S. Kline, named divisional controller of the Alloy Tube Div., Union, N. J., and Webb Wire Div., THE CARPENTER STEEL CO.

Paul H. Goodell, appointed sales manager, CATALYTIC COMBUSTION CORP., Detroit.

Myron M. Hemmerdinger, appointed director of material, at INET, INC., Los Angeles.

Martin H. Smith, joins Technical Service Dept., ATLAS MINERAL PRODUCTS CO., Houston.

Sumner L. Barton, appointed general district manager, Chicago, GREER HYDRAULICS, INC.; and **Leonard H. Seeman,** named assistant production manager, Industrial Div.

Jackson Kemper, appointed general manager, Watson-Stillman Fittings Div., H. K. PORTER CO., INC., Roselle, N. J.

Raymond F. Crisp, made manager of technical services, HYCON MFG. CO., Pasadena, Calif.

J. Howard Batchelor, appointed general manager, THE LIBERTY MANUFACTURING CO., Santa Monica, Calif.

John M. Tuthill, appointed assistant general manager of sales, Chicago offices, YOUNGSTOWN SHEET & TUBE CO., Youngstown He succeeds the late Arthur M. Long.

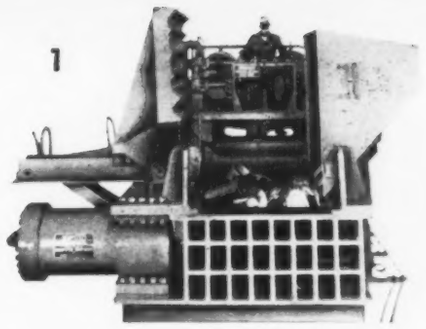
Michael J. Sonk, Jr., appointed materials handling engineer, Detroit office, PITTSBURGH STEEL PRODUCTS CO.

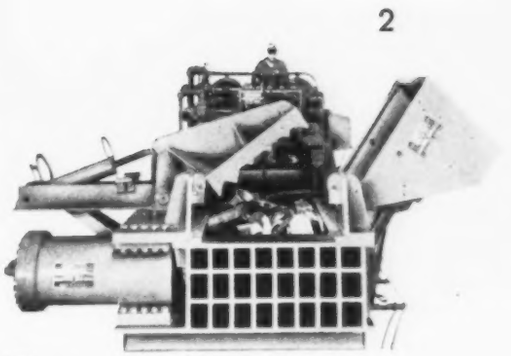
McAndrew McCall, named chief design engineer, Construction Dept., Machinery Div., DRAVO CORP., Pittsburgh.

OBITUARIES

Walter M. Floto, 59, sales executive American Steel & Wire Div., U. S. Steel, Chicago, recently.

Robert Harkness Ellis, manager, Electrical, Service and Construction Departments, United Engineering and Foundry Co., Pittsburgh.





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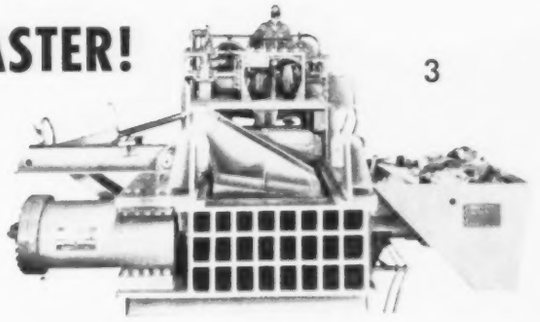
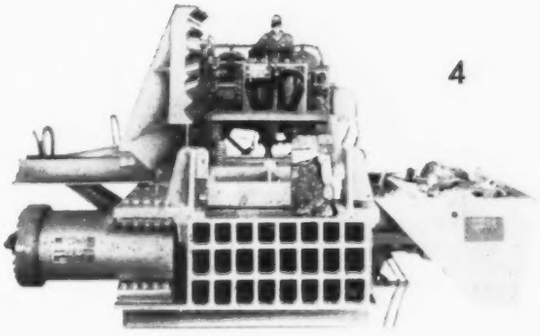


The key to low cost scrap metal baling is fast, consistent baling. The big capacity *Model "600" Dempster-Balester* high speed press pictured here will bale your scrap as fast as your crane can feed it! This tremendous baling speed is due to the Dempster-Balester's 1-2-3-4 hydraulic cycle. 1—Skip Pan Loader loads charging box (see Photo 1). 2—Skip Pan returns to loading position as Auxiliary Compression Door compresses scrap with a 45-ton force. (see Photos 2 and 3). 3—Charging box door is closed and scrap is baled, then 4—finished bale, weighing between 600 and 1,000 pounds, is ejected. (see Photo 4). Without question, *Dempster-Balesters* are the fastest, most efficient presses baling scrap! For complete information clip coupon below and mail to us today. A product of Dempster Brothers, Inc.



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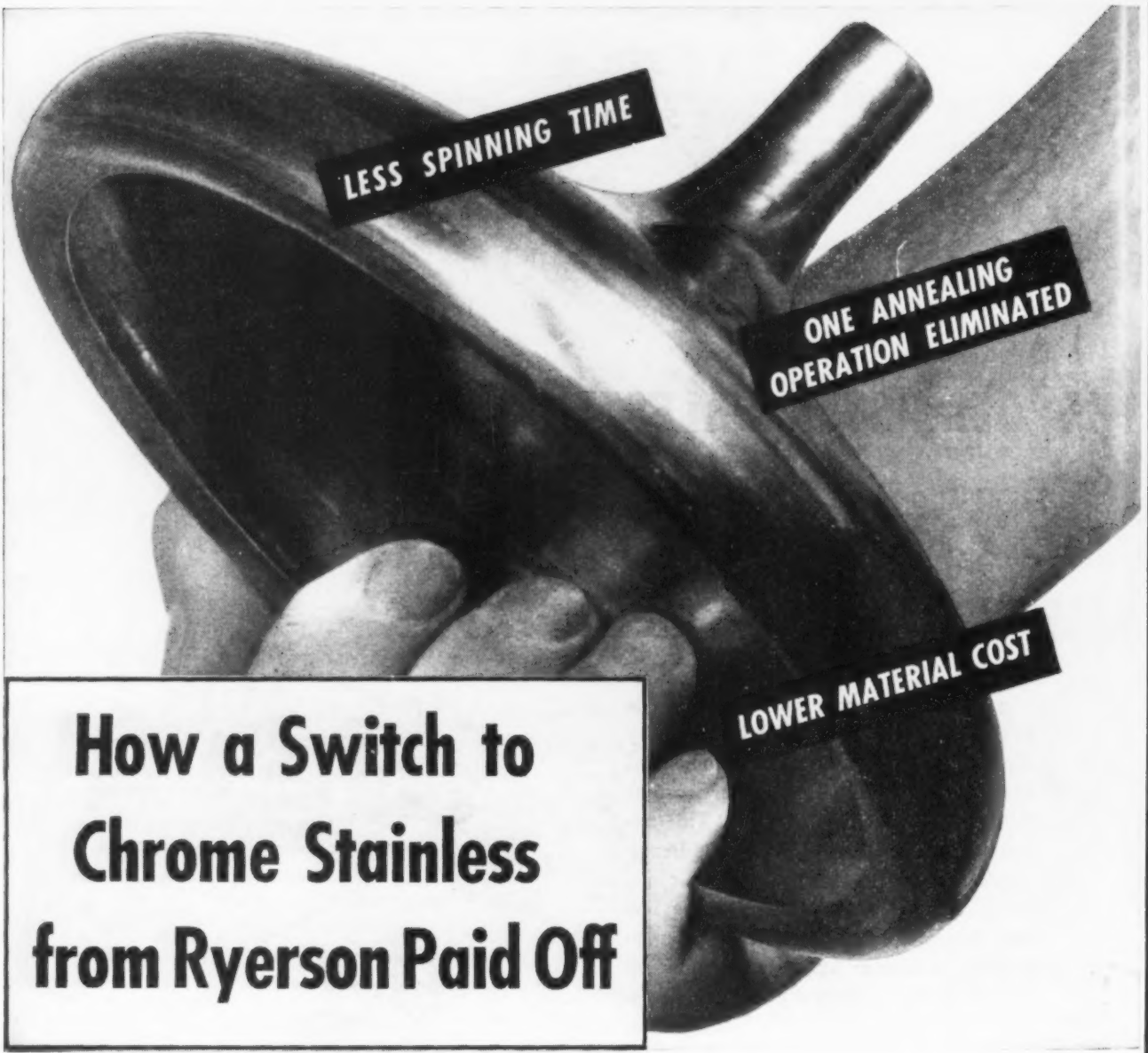

How a Switch to Chrome Stainless from Ryerson Paid Off

Here's how a Ryerson customer kept his business going when NPA Order M-80 cut off his supply of nickel-bearing stainless. This manufacturer was turning out vacuum tops for coffee dispensers. He was using Type 305 nickel-bearing stainless in his product—thought 305 was the only steel for the job. Restrictions on nickel meant discontinuing production or finding an alternate material.

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* * *

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The Iron Age
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Technical Articles

Hot-Cold Work Improves 16-25-6 Properties

By M. Fleischmann
Metallurgical Engineer
The Timken Roller Bearing Co.
Canton, Ohio

Jet engines offer a wider field for application of the 16-25-6 chrome-nickel-moly steel alloy developed during World War II for gas turbines and turbo superchargers. Now, reliable long time test data are available for the design engineers. Extended 10,000-hr-plus creep tests have been conducted with varying heat treatments. In one case bars were water quenched from 2150° F to give solution of carbides with minimum hardness. In another case, hot-rolled 1 in. bars, reduced about 25 pct by finish rolling at 1500° F, were tempered 6 hr at 1275° F. For highest room temperature properties with minimum creep in operation, forged turbine wheel rims are hot-cold worked at temperatures between 1200° and 1300° F.

Mass production of jet engines demands commercial materials readily available in uniform quality. The 16-25-6 chrome-nickel-moly alloy developed by the Timken Roller Bearing Co. in 1942 and successfully used in gas turbines and turbo-supercharger applications during World War II, is now finding a wider application in jet engine turbine wheels.[1] Today this constitutes the major production application for the alloy.

Chemical specifications of the metal show it to be free of high strategic elements like columbium or cobalt which would restrict its mass production. It is also of relatively simple composition which should prevent undue difficulties in the melting of commercial heats. Chemical analysis, closely controlled at Timken, is shown in Fig. 1. Chemical variation in 102 consecutively melted 25-ton heats of 16-25-6 alloy is expressed as frequency of the main alloying elements.

While life expectancy of the aircraft engine,

ANALYSIS OF 16-25-6 ALLOY

C	Mn	P	S	Si	Cr	Ni	Mo	N
0.12 Max	2.0 Max	0.03 Max	0.03 Max	1.0 Max	15.0/17.5	24.0/27.0	5.5/7.0	0.10/0.20

"Total deformation (to 1300°F) . . . may be materially reduced by previous cold working . . ."

either as a turbo-jet or as a gas turbine in the project unit, rarely exceeds 1000 hr. Use of the 16-25-6 alloy for prime movers, however, as in gas turbines for stationary power units, for locomotive and ship propulsion, demands long-life data which only could be obtained by prolonged time creep and rupture tests.

To get this information, creep and rupture tests of at least 10,000 hr were conducted. Two conditions of heat treatment were considered. Water quenching bars from 2150°F resulted in solution of the carbides with minimum hardness. Tempering for 6 hr at 1275°F, hot-rolled 1-in. round bars which had been reduced about 25 pct by finish rolling at 1500°F was also tried. Finishing at this low temperature imparted considerable cold work. Subsequent tempering treatment relieved stresses without materially affecting the hardness.

Room temperature mechanical properties after these two treatments are given in the Table with corresponding hardness values and structural grain sizes.

These two sets of mechanical properties also represent maximum and minimum strength values which may readily be obtained in practice. Any intermediate properties may be specified and are produced by varying the amount of cold work introduced into the material either after hot-rolling or forging—or after a solution treatment, Figs. 2 and 3.

Creep tests at 1200° and 1300°F of at least 10,000 hr duration were conducted in both conditions of heat treatment. Two stresses were used at each temperature and treatment. A third stress of 20,000 psi representing a creep test conducted by Westinghouse Mfg. Co. and extending over nearly 2 yr was also included in the curves for solution-treated material at 1200°F. The resulting time-elongation curves are shown in Figs. 4 and 5.

Creep rates, at the various time periods, are shown on the curves. Time under stress has an important effect on magnitude of creep rate values. How misleading conclusions may be drawn from short-time creep data is indicated by comparing the creep rates at 1200° and 1300°F obtained after 1000 hr under an identical stress of 12,500 psi. At 1200°F, a creep rate of 0.125 pct was found while at 1300°F the creep rate was only 0.064 pct which would indicate.

It is of interest to compare the creep curves of the solution treated material with those of the hot-cold worked alloy under the same stress and at the same temperature. This comparison is made in Fig. 6 at 1200°F and in Fig. 7 at 1300°F. At 1200°F total deformation as well as the creep rate of the solution-quenched material is many times that of the hot-cold worked alloy, especially after more prolonged time at test. At 1300°F, practically identical creep rates were observed between 2000 and 6000 hr although total deformation of the solution-treated material is about twice that of the hot-cold worked alloy under the same stress. These curves indicate that at least up to a temperature of 1300°F total deformation under a given stress may be materially reduced by previous cold working of the material.

Stress-rupture tests were conducted on the solution quenched alloy at temperatures of 1000° to 1500°F and on the hot-cold worked material at 1200°, 1300°, and 1400°F. Some of the stresses used resulted in rupture times exceeding 10,000 hr.

The stress-rupture curves are shown in Fig. 8 representing the solution-quenched condition and in Fig. 9 for the cold-worked alloy. A comparison between the two conditions of heat treatment is given in Fig. 10, indicating that

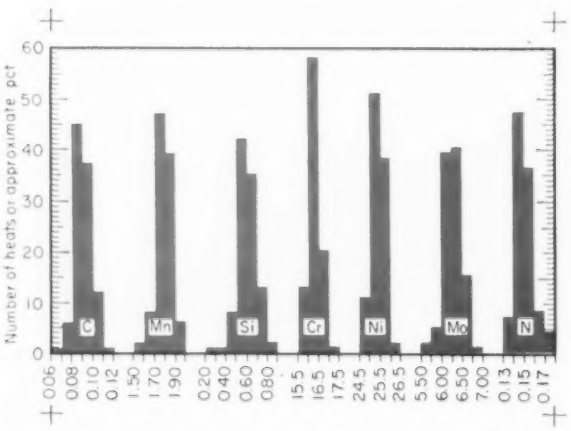


FIG. 1—Chemical variation in 102 consecutive 25-ton heats of 16-25-6 alloy melted from Jan. to June 6, 1952, expressed as frequency of the main alloying elements.

TABLE MECHANICAL PROPERTIES AFTER HEAT TREATMENT

Heat Treatment	Proportional Limit Psi	Yield Strength Psi 0.1 pct	Yield Strength Psi 0.2 pct	Ultimate Strength Psi	Elong. pct in 2 in.	Red. of Area pct	Bhn	Grain Size
Solution Quenched 2150 °F	25,000	48,500	51,000	118,000	46.0	64.8	188	4/6
Hot-Cold Worked Tempered 6 hr 1275 °F	75,000	117,000	120,000	150,000	18.0	32.0	302/321	8

Microstructures corresponding to the two conditions of heat treatment are shown in Figs. 2 and 3.

the hot-cold worked material is stronger at the lower temperature but does not retain this superiority at 1400°F.

The elongation-to-fracture values shown in Figs. 8 and 9, indicate ductility decreases as fracture time is extended. For fracture-time periods of the order of 10,000 hr, elongation of solution-quenched material at both 1300° and 1400°F was only about 1.5 pct while that of the hot-cold worked specimen at 1300°F was still 7 pct. Superior ductility to fracture is associated with the hot-cold worked material. It is finer grained and less subject to precipitation hardening than the solution quenched alloy.

A new method for calculating stress-rupture data from test results on only a few hours' duration has recently been developed by F. R. Larson and J. Miller of the General Electric Co.[2] This method is based upon the assumption that creep and rupture of material would follow rate-process theories as expressed by the equation:

$$T\ (20 + \log t) = \text{constant}$$

where T = absolute temperature, Deg. R
and t = time to rupture in hours.

This equation gives a definite relation between the temperature and time to rupture and if, therefore, rupture stress is plotted as a function of the parameter T (20 + log t) all points should fall on a single curve.

Plotting the stress-rupture results obtained for the 16-25-6 alloy according to this method, single curve can be drawn, Fig. 11, even though the rupture tests had been conducted from a few hours' to 10,000-hr duration at temperatures ranging from 1100° to 1500°F and the material had been subjected to different prior heat treatments.

It should be possible, therefore, to establish the shape of the curve from points obtained by relatively short-time rupture tests of about 10 to 100 hr duration at temperatures from 1000° to 1700°F and arrive at satisfactory calculations for long-time rupture strengths in the temperature range of 1100° to 1500°F.

Total deformation with time under stress at temperature is of most importance to the designing engineer in the selection of a material for rotating power units operating at high temperatures. Based upon accumulated time-elongation tests, the curves shown for the 16-25-6 alloy in Fig. 12 indicate the stress

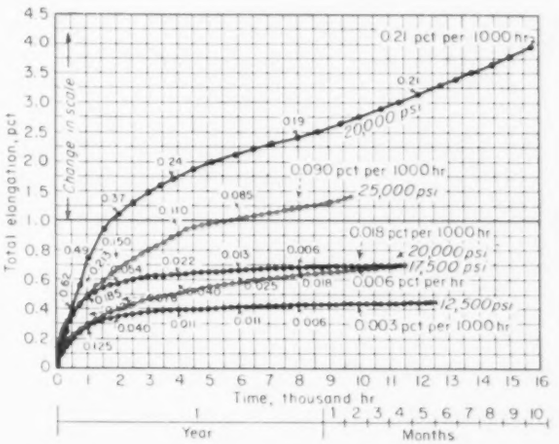


FIG. 4—Time-elongation curves for creep tests on the alloy at 1200° F. Black lines show metal solution quenched from 2150° F. Color lines show metal finished at 1500° F and tempered 6 hr at 1275° F.

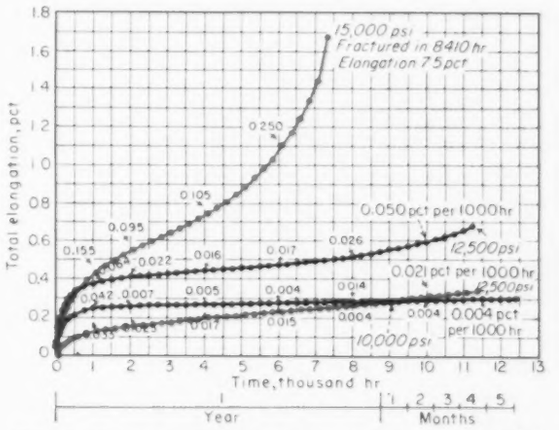


FIG. 5—Time-elongations curves for creep tests at 1300° F. Black lines show metal solution quenched at 2150° F. Color lines show metal finished at 1500° F and tempered 6 hr at a temperature of 1275°F.

FIG. 2—Photomicrograph showing structure of 16-25-6 alloy solution quenched from 2150° F. X500

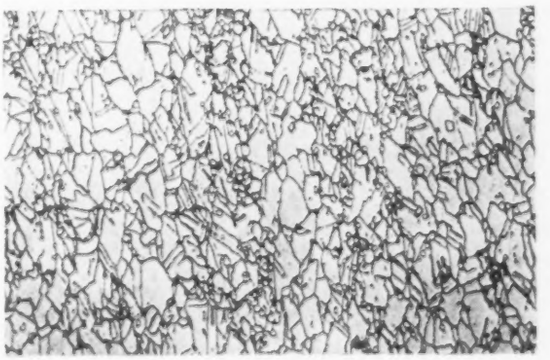


FIG. 3—Structure of 16-25-6 alloy hot-cold worked and tempered at 1275° F for 6 hr. X500

"To obtain highest room temperature properties . . . the 16-25-6 alloy rim has to be cold-worked."

values which will lead to total deformations of 0.2 pct and 0.5 pct after 1000 hr at temperatures between 1100° and 1400°F. The hot-cold worked material possesses the better load-carrying ability up to about 1350°F for an allowable deformation of 0.5 pct in 1000 hr. This temperature limit is extended to 1400°F, if the allowable deformation is only 0.2 pct for a time period of 1000 hr.

One of the outstanding accomplishments in the design of jet engines is the GE development of the composite turbine wheel, where a highly alloyed rim is welded to a low alloy hub. This design not only saves large amounts of strategic alloys but also employs in a single part the available engineering materials to their best advantage. Due to its excellent weldability, and desirable high temperature properties, the 16-25-6 alloy had been selected as the rim material. SAE 4340 is used in the hub where its heat treated properties are used advantageously at the relatively low operating temperature of the wheel center.

To obtain highest room temperature properties as well as the minimum stretch or creep in operation during the life expectancy of the jet engine turbine wheel, the 16-25-6 alloy rim has to be cold worked. Up to the present time this has been accomplished by hot cold-working the forged rims at temperatures between 1200° and 1300°F. Very large hammers are required for this warm working operation and control of the end point which determines the final mechanical properties, especially ductility, is difficult to maintain.

A new method of cold expanding turbine wheel rims* recently developed at Timken will eliminate many shortcomings inherent in cold forging, does not require large hammers, and will produce a most uniform product.

The method consists in hot forging a rim about 20 pct smaller on its OD and 30 pct smaller on the ID than the desired final dimensions. After concentric machining, this ring is expanded at room temperature on the die illustrated as a schematic drawing in Fig. 13. This die consists of a hexagonal tapered punch working against six segments which on their OD are machined to 3-stepped diameters. With this arrangement, a hot forged ring of 16-25-6 alloy equalized at 2100°F and machined concentrically may readily be expanded in three consecutive steps on the same die to about a 30 pct larger inside diameter, raising its hardness from about 187 to 269 Bhn.

This large amount of expansion is only possible with austenitic materials which in the annealed condition will elongate uniformly and exclusively along a gage length previous to any final localized necking down.

A tempering operation at 1300°F for 12 hr will equalize the hardness variation between OD and ID—a result of the percentage difference between OD and ID elongation inherent to this method of stretching.

Fig. 14 illustrates a contour-machined turbine wheel rim before and after expanding. The changes in cross sectional dimensions, corresponding to a reduction of area resulting from the stretching of the material by this method of cold working, may be calculated and readily maintained even on contour-machined rings.

* Patent applied for.

References

[1] M. Fleischmann, "16-25-6 Alloy for Gas Turbines," The Iron Age, Jan. 17 and Jan. 24, 1946.

[2] F. R. Larson and J. Miller, "A Time-Temperature Relationship for Rupture and Creep Stresses," presented at Nov., 1951 meeting of ASME.

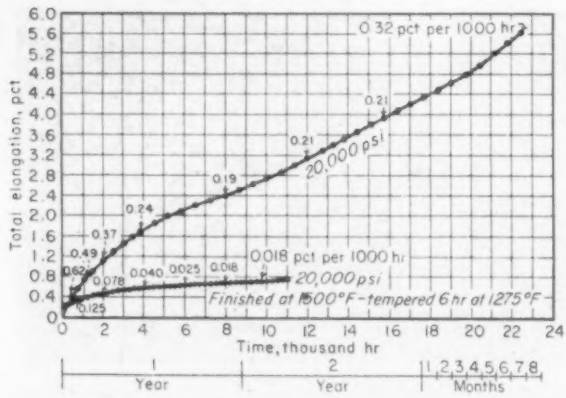


FIG. 6—Effect of processing upon creep rates under a load of 20,000 psi, 1200°F, for creep test results.

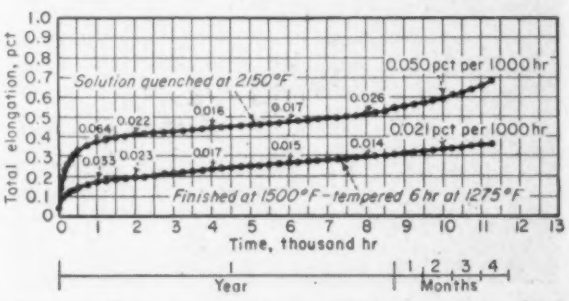


FIG. 7—Effect of processing on creep rates under a load of 12,500 psi is shown in time-elongation curves for tests on 16-25-6 at 1300° F.

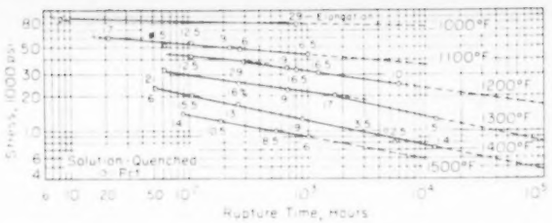


FIG. 8—Stress-rupture time curves for solution-treated 16-25-6 alloy plotted to log-log coordinates.

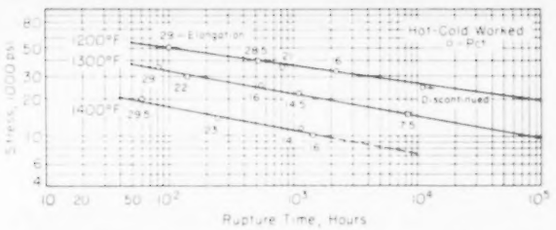


FIG. 9—Stress-rupture time curves for hot-cold worked 16-25-6 alloy. Plotted to log-log coordinates.

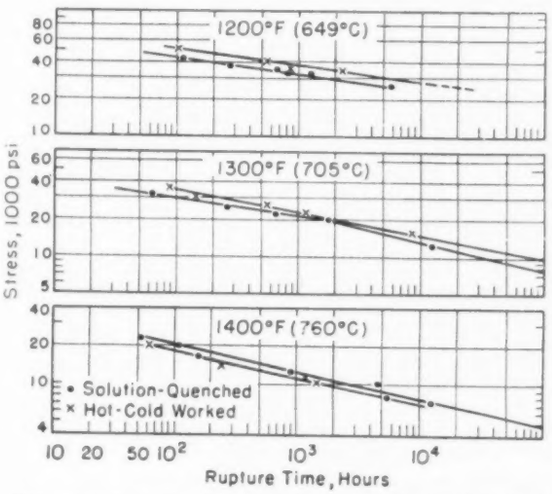


FIG. 10—Effect of solution quenching and hot-cold working on rupture strength of 16-25-6 alloy.

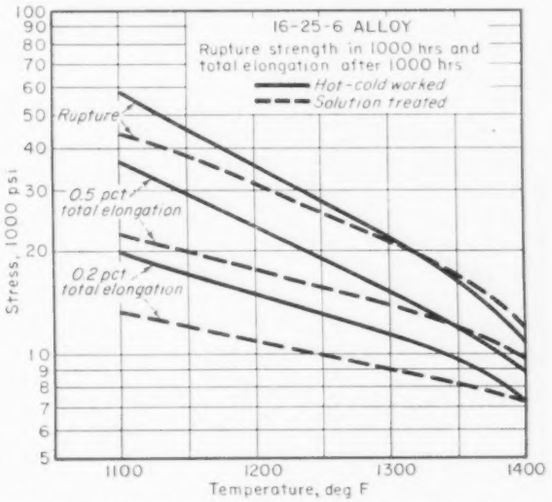
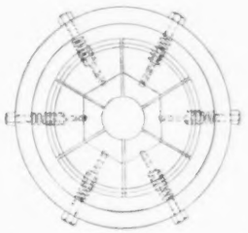


FIG. 12—Effect of heat treatment on rupture strength and total elongation after 1000 hr.



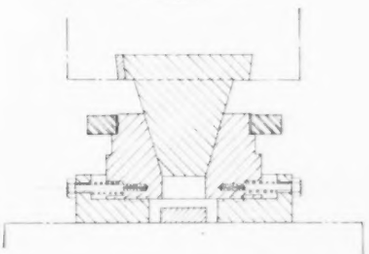
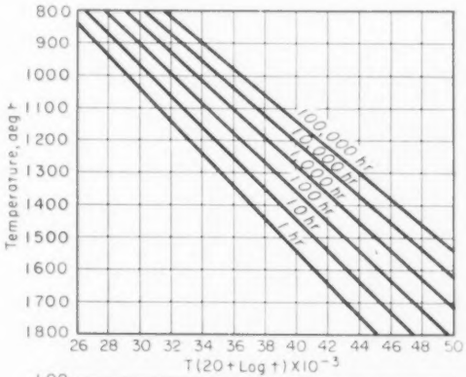


FIG. 13—Schematic drawing of expanding die for the cold working of turbine wheel rims.



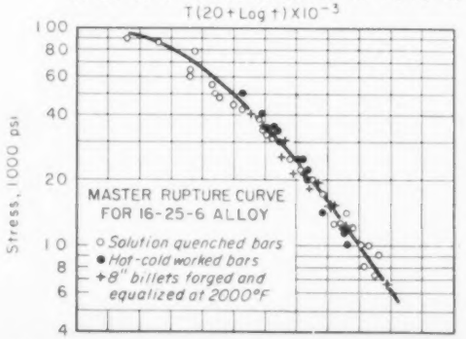

Stress, 1000 psi
MASTER RUPTURE CURVE FOR 16-25-6 ALLOY
Solution quenched bars
Hot-cold worked bars
8" billets forged and equalized at 2000°F

FIG. 11—Master rupture curve for 16-25-6 alloy.

FIG. 14—Turbine wheel rim before and after expansion.

Lets keep it straight—

Automatic heat-treating SPEEDS GEAR AND PINION PRODUCTION

By Herbert Chase
Consultant
Forest Hills, N. Y.

Installation of new heating and quenching equipment has virtually eliminated the need for slow and expensive pinion straightening operations. Previously, almost every pinion-and-shaft unit had to be straightened to bring it within the 0.002-in. allowable tolerance for bearing surfaces. Now, only 3 pct require straightening and 75 pct fewer units are scrapped. Except for loading and unloading, the new setup is fully automatic. Handling has been reduced considerably, production increased sharply, quality improved.

Pinion-and-shaft units for automobile rear axles are among the parts made by the Buick Motor Div. of General Motors Corp. at its Flint plant. The forgings for these units, made of a modified SAE 4118 steel, are completely machined before they are heat-treated except for grinding of bearings and lapping of pinion teeth.

Until recently, the pinions were carburized in pots and then case-hardened by quenching in oil. Some warpage occurred in practically every unit so that straightening was required to keep within the 0.002-in. allowable tolerance for bearing surfaces. Moreover, an average of about 18 to 20 parts had to be scrapped per day. These difficulties led to the installation of 2 new carburizing furnaces and 2 new pinion machines. Now, only 3 pct of the pinions exceed the allowable tolerance and 75 pct fewer units are scrapped.

Case hardening is controlled to a depth of 0.040 to 0.050 in. by furnace time and temperature. Pyrometers maintain the temperature by controlling the firing rate of the radiant tubes. RX generators supply the furnace with catalytically cracked natural gas and air to which some natural gas is added to give the desired carbon concentration. Gas flow is 1200 cfh of cracked generator gas and 50 cfh of natural gas.

Nichrome trays, each containing 6 pinions or 6 gears, are unloaded alternately from an overhead chain conveyer and placed in the furnace, Fig. 1. In stacking, gears are spaced so they do not bear the weight of the gears above. Pinions set on end, are racked with Nichrome wire to prevent their displacement in the furnace, Fig. 2.

Pushers serve each of 6 tracks in the furnace. The furnace vestibule is loaded with 6 trays after which the vestibule door closes. The vestibule is then purged of air by natural gas to prevent contamination of furnace atmosphere. As the furnace doors open automatically, the pushers advance the trays along the 6 tracks. A push takes place every $2\frac{3}{4}$ min so that $16\frac{1}{2}$ min are required for successive pushes on each of the 6 tracks.

The trays are in transit through the furnace for $9\frac{1}{2}$ hr. While in transit, the trays pass through 5 zones, each having its own combustion

THE AUTHOR—Mr. Chase, engineer, former trade magazine editor, and author of engineering texts, has been closely associated with industrial developments since 1910.

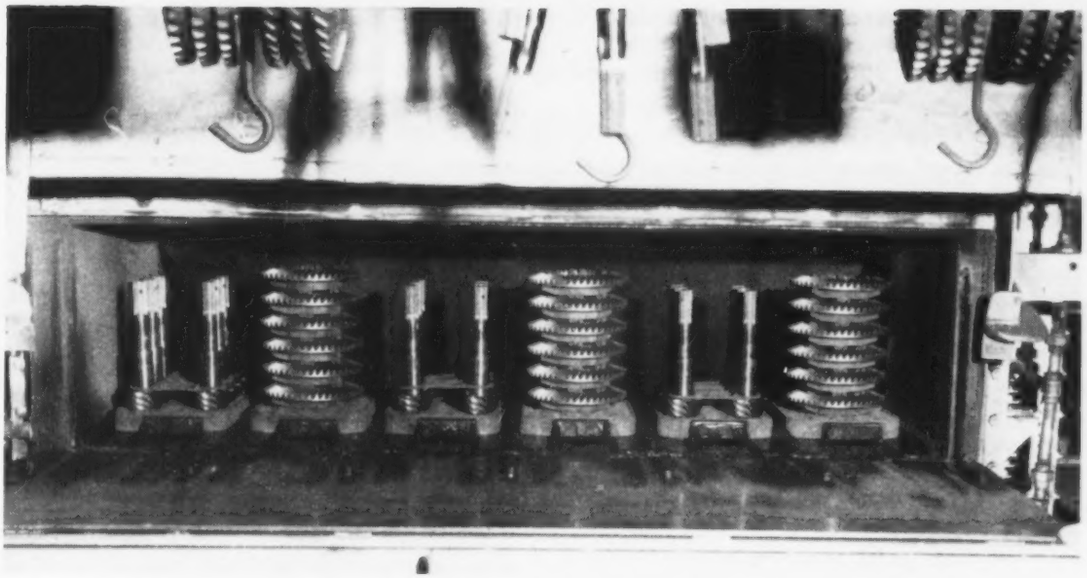


FIG. 1—Six Nichrome trays, each containing 6 gears or 6 pinions, are placed in the furnace vestibule. Parts are brought to the loading station on an overhead chain conveyer and trays on a roller conveyer.

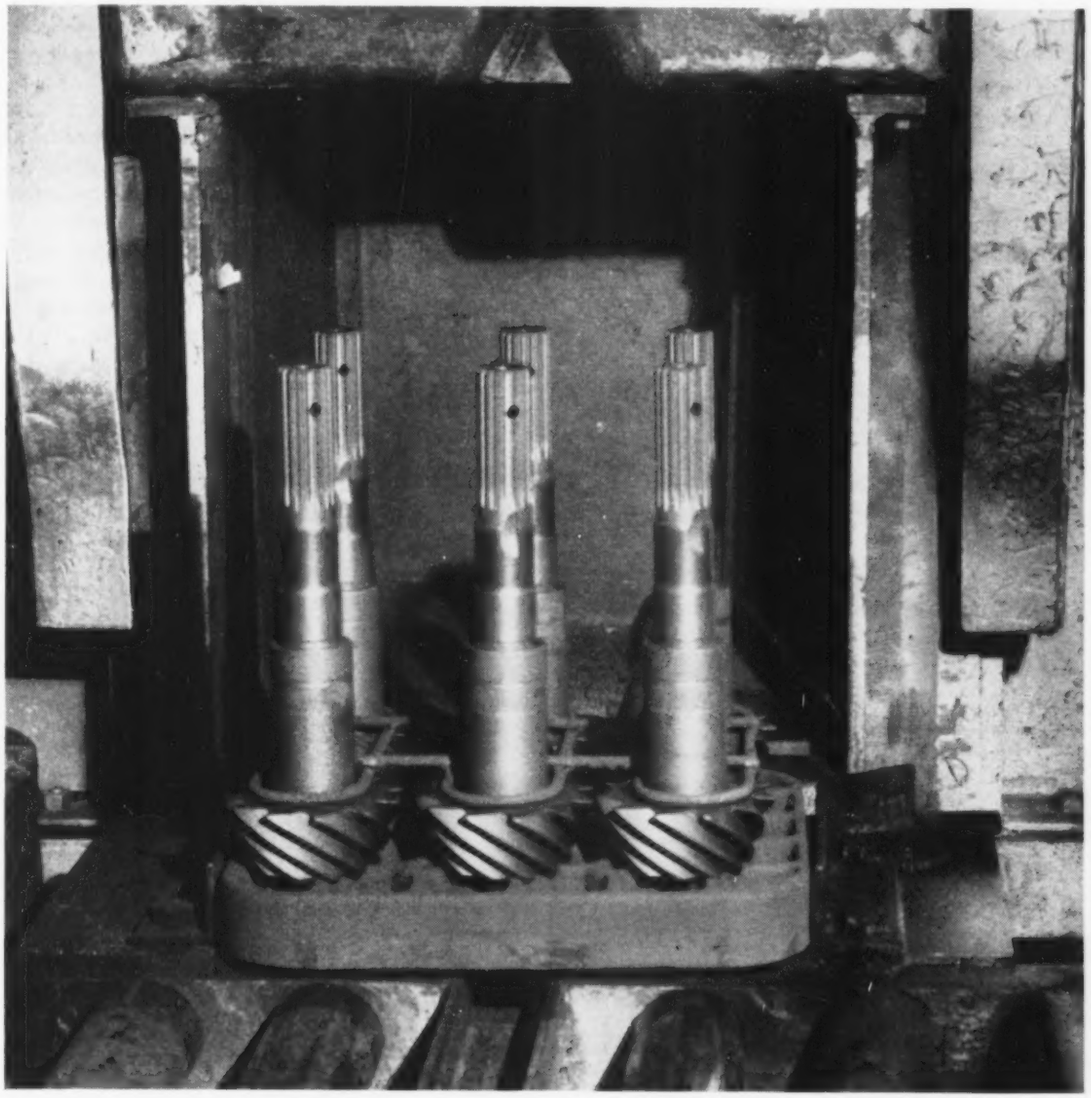


FIG. 2—A tray of 6 pinions, heated to quenching temperature, is pushed from the exit vestibule of the furnace. After the wire rack is removed, the pinions are placed one at a time in the quenching machines.

"Rollers contact the pinion which rotates at 300 rpm to effect pinion straightening . . ."

controls. In the first 2 zones, the radiant fired tubes are of 5-in. diam to provide high heat input. The other zones have 4-in. tubes. Zone temperatures are 1525, 1550, 1650, 1625 and 1500°F respectively.

At the furnace exit door, a tray of gears or pinions is unloaded alternately every 2¾ min. Gears are then set into conventional quench presses and pinions are set into new machines having 3 quenching stations, Fig. 3.

As soon as a pinion is in place, a push button starts an automatic cycle. It activates the loading arm, lowers the top center into place, returns the loading arm to position and closes the quench compartment cover, Fig. 4. After the cover is closed, rollers contact the pinion which rotates at 300 rpm to effect pinion straightening. Rotation continues 7 sec before quench oil at 110°F is sprayed into the compartment for 1½ min. Rotation then stops, oil is drained from the machine, the compartment door opens, the loading arm contacts the pinion and the top center retracts to complete the automatic cycle. Each machine is capable of quenching 30 pinions per hr.

Quenching is uniform and complete except for the threaded portion. During the quench, this portion is enclosed by a split sleeve. As a result, quench oil is not sprayed on the thread which is left soft enough to resist chipping.

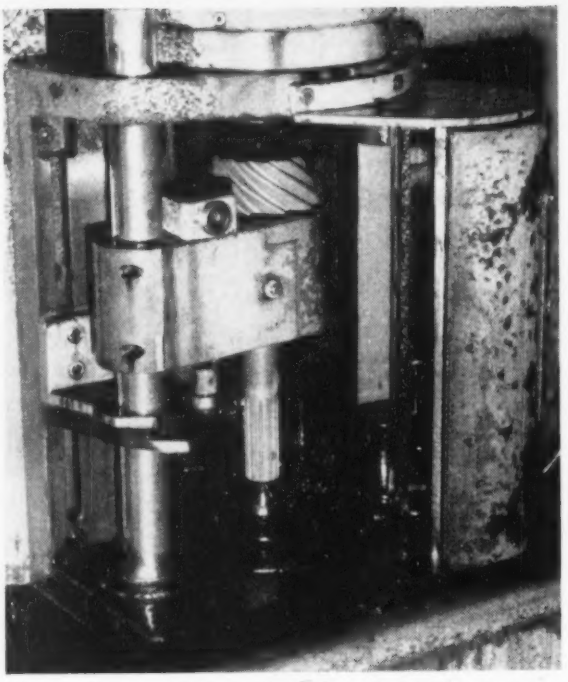


FIG. 4—With a pinion in place, the gate applies pressure to the shaft which rotates at 300 rpm. When the door of the station closes, quenching oil is sprayed into the compartment about 7 sec later.

Centers in the quenching fixtures are hollow so that they may convey compressed air to cool them before quench oil enters the compartment.

With this new setup, one man now loads the furnace. The only handling at the unloading end is in setting the gears and pinions in the quenching fixtures and placing the trays onto the conveyer for return to the loading station.

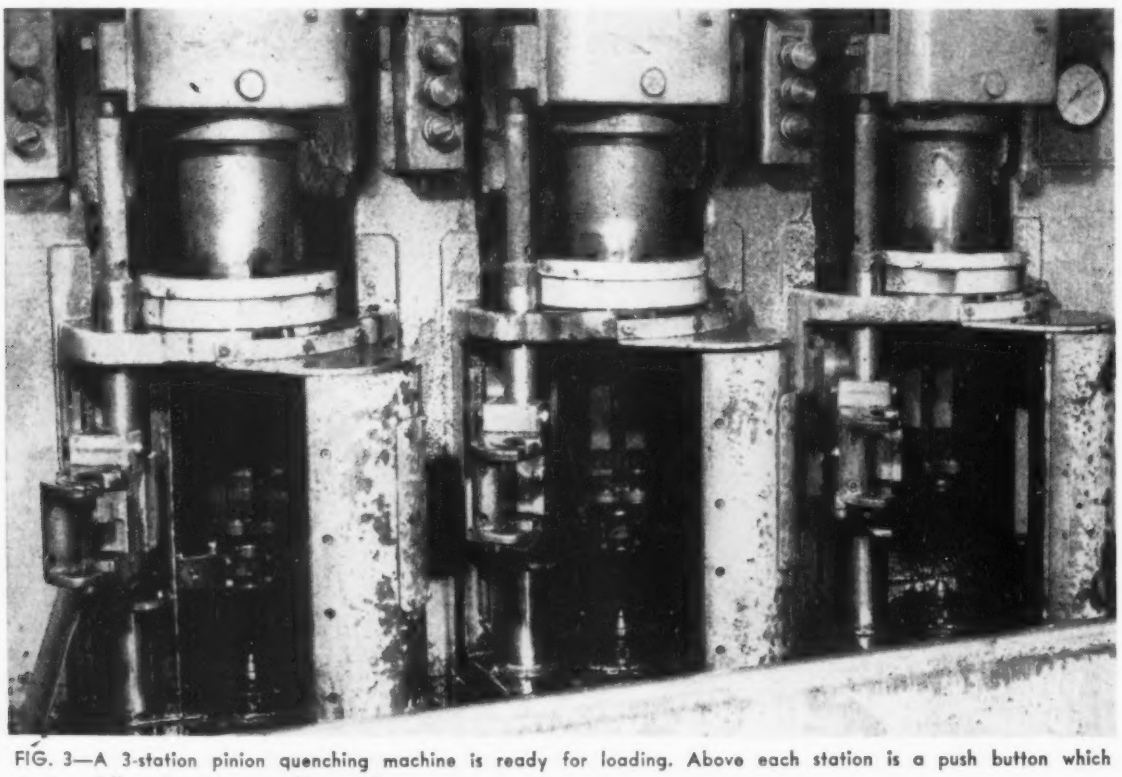


FIG. 3—A 3-station pinion quenching machine is ready for loading. Above each station is a push button which starts a fully automatic quenching cycle.

A dash of iron—

New Copper Alloy Has HIGH STRESS-CORROSION RESISTANCE

By C. H. Hannon
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General Electric Co.
Pittsfield, Mass.

A new copper-nickel-silicon alloy developed by metallurgists of General Electric Co. and Revere Copper & Brass, Inc., shows high resistance to stress-corrosion failure. Addition of critical amounts of iron to the Cu-Ni-Si alloy gave improved properties. While excellent properties are found in sand cast and hot-forged parts, highest mechanical properties are developed by successive solution and aging heat treatments.

One of the oldest recognized weaknesses of alloys not directly associated with obvious physical or mechanical properties, is failure of the copper-base alloys by stress corrosion and/or season cracking. Early thinking on this phenomenon was associated with the copper-zinc alloys. Engineering experience warned against use of high brasses in applications imposing service stresses in tension or where residual stress in a wrought alloy might cause failure. Relatively strong high copper alloys with little or no zinc, such as the aluminum bronzes and silicon bronzes were developed. General application of such alloys followed in line hardware, electrical apparatus terminal designs, and in applications where strength was essential. Occasional service failure even with these compositions might suggest that all copper alloys would fail under critical conditions of stress and corroding media. An alloy with high resistance to fracture, under conditions promoting stress-corrosion, would be of great value in construction of any device which required high tensile strength associated with exposure to corrosion. An alloy which could be installed without limit to torque load below the ultimate strength and which would be immune to the hazard of service failure (cracking) would be of particular value.

The project at GE to evaluate the stress-corrosion sensitivity of commercial copper alloys, initially included tests on hot-forged eyebolts, sand-cast eyebolts or on studs machined from commercially available cold-drawn bar alloys. Test pieces were clamped to varying magnitudes of torque. Assemblies were exposed to a mercurous nitrate solution prescribed in ASTM B154 or suspended in vapor generated over a standard 28 pct reagent ammonium hydroxide solution, in a closed chamber.

Failures manifested by fracture of the test pieces, when clamped at different torque loads

"When the alloy is subjected to a corrosive medium, fissures start at the metal surface . . ."

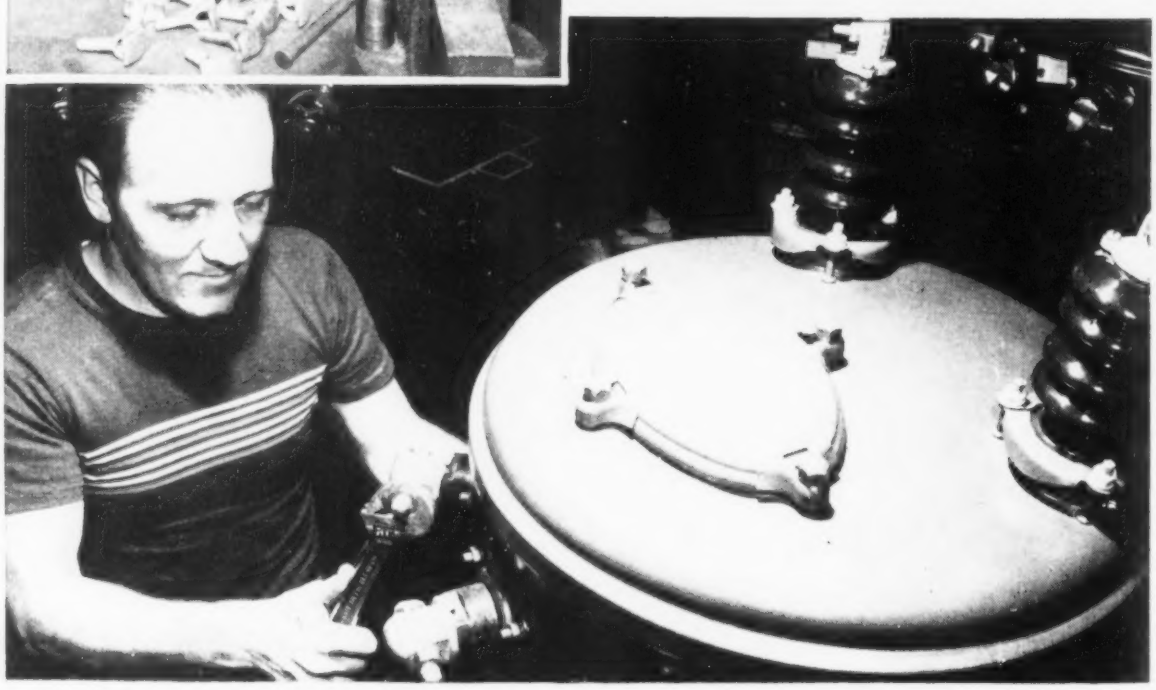
below ultimate strength, indicated the stress-sensitive nature of the alloys. Of the many commercial alloys tested none was observed which did not disclose a critical stress sensitivity, if the imposed torque stress was progressively increased to a high enough level.

The project was eventually extended to the status of an objective research program in which metallurgists of General Electric Co. and Revere Copper and Brass Inc. pooled their efforts. The copper-nickel-silicon alloy series was studied. Variation in composition with particular interest in the effect of the nickel-silicon ratio was appraised. It was discovered that within narrow ranges of nickel and silicon a copper-nickel-silicon type alloy (Strenicor) could be rendered non-susceptible to stress-corrosion failure by addition to the alloy of a critical amount of iron.

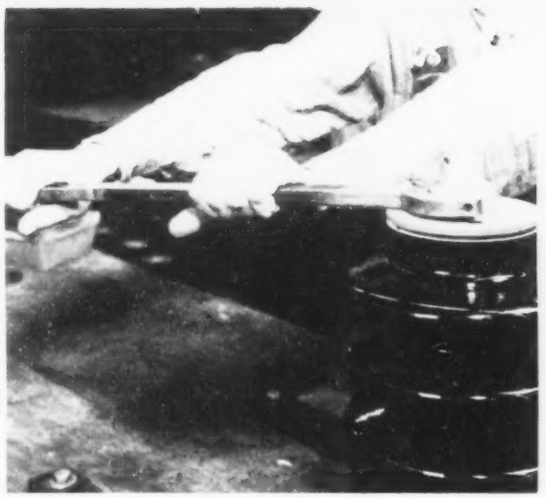
Susceptibility to stress-corrosion cracking is believed to result from existence of continuous anodic zones within the alloy structure. When the alloy is subjected to a corrosive medium, fissures start at the metal surface as the result of electro-chemical action between anodic and cathodic areas. If high tensile stresses—from tensile or torque loading—are present at the surface, the small fissures increase the magnitude of local stresses at the apex of the fissures. This increases their depth. New metal is exposed which is consumed by electrolytic corrosion. Stresses are further increased at the fissures, and the material ultimately fails.

The critical minimum requirement of iron, it is believed, results in elimination of the contiguous zones of different electrochemical potential. While the optimum properties may be attained in either the cast or wrought form, some variation in the percentage of iron is desirable because of its influence on the hot and cold-working properties. Within a composition range of 3.5 to 5 pct nickel, 0.7 to 2 pct silicon, and 0.3 to 1 pct iron with the balance essentially copper, the alloy may be cast to form satisfactory articles. A preferable analysis for the fabrication of wrought products would limit silicon

CLAMPING of eyebolts at measured torque load prior to testing in mercurous nitrate or ammonia.



ASSEMBLING Strenicor pressure terminal clamps on distribution transformer at Transformer & Allied Products Div.



APPLYING clamping pressure in high voltage bushing by means of sand cast heat treated Strenicor spring washer.

to 1 pct in conjunction with an amount of iron not exceeding 0.5 pct.

Excellent properties are found in sand cast or hot-forged parts. But highest mechanical properties are developed by successive solution and aging heat treatments. A suitable heat treatment consists of thorough heating at 900 C followed by quenching or rapid cooling plus a subsequent aging cycle at 540 C for about 2 hr. Typical values following the complete treatment are shown in the table.

Form	Tensile Strength, psi	Yield Strength, psi*	Pct Reduction in Area	Pct Elongation in 2 in.
Sand Cast H. T.	90000	70000	8	1
Hot Forged H. T.	107000	83000	7	5

* Based on 0.5 pct elongation under load.

These properties, plus immunity to failure by stress corrosion, have led to the alloy's use in hot-forged eyebolts in transformer terminal clamps. Parts have withstood both ammonia vapor and mercurous nitrate solution, when clamped to just below the ultimate strength of the eyebolts. Another proved application is a sand cast Belleville type washer. Assembly pressure is applied through the washer to a center clamp transformer bushing. Clamping pressure completely compresses the dish-shaped washer.

Electrostatic Field Acts as Safety Device

A new type of safety device which also offers the possibility of increasing production has been developed for presses. Unit comprises an electronic control utilizing an electrostatic-capacitance field. The field is radiated from two loops surrounding the bolster plate, ram and other danger areas needing protection.

Developed by Security Controls, Inc., Buffalo, the SCI-500 loop control can be used on any type of machinery that is equipped with clutch and brake devices which permit the machine to be stopped when a signal is given. This would include punch presses, rubber mills, die casting machines, shears.

The electrostatic capacitance field is tuned and adjusted to the normal ground potential of the press, its dies and the work. When the field is unbalanced by an operator's hand or other undesired objects entering the area of the protective field, relays within the control unit function and actuate press and brake solenoids which stop the press. The press cannot be started again until the unbalance is eliminated.

Only the loops have to be tailored for the particular press involved. Loops are mounted on insulated blocks attached to the frame. The control box mounted on the side of the frame has two cables coming from it which are connected to the loops at the mounting blocks. In the control box two low powered oscillators put out a radio signal or wave length which is transmitted through the cables and are generated by the loops. Loops are electric thin walled conduit.

The protective field radiated by the loops can be extended or reduced in area depending on the size of the area to be protected. The field can also be adjusted to account for variations in stock thickness of a few thousandths of an inch.

The unit can be installed to function throughout the entire press cycle or any portion of the cycle. Complete, continuous protection of the operation is usually made when the stamping is small and automatic feeding is used. Limited or intermittent cycle protection is used where large stampings are made and time is required between strokes to unload, clean the dies and feed. This is where time saving and increased production is claimed, since the operators can work during any portion of the cycle not requiring protection without danger and without stopping the press. The last 3/16 in. of the stroke is never protected so that bottom dead center stops are prevented.

The electronic control unit is shock mounted inside the control box placed on the side of the frame. Wires from the control box are connected to the brake and clutch combination or individual brake and clutch. For partial protection of the cycle these wires may be run through a cam limit switch which controls the ram cycle.

The press cannot be operated unless the control box is closed and locked.

Pulled hot—

Stress-Rupture Characteristics of Unalloyed Titanium Plotted

By F. B. Cuff, Jr.
Research Asst.

and

N. J. Grant
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Massachusetts Institute of Technology
Cambridge, Mass.

The creep-rupture behavior of annealed titanium in air is complex. The effects of surface treatments and test atmosphere are important especially in small cross section test bars due in part to alloying of the titanium with oxygen and nitrogen. The relative contributions to the strength of such alloying and from grain growth are not fully known. Such surface reactions tend to improve the rupture life performance of titanium at temperatures greater than about 900° or 1000°F. There is a sharp loss of strength as titanium passes through the equi-cohesive temperature. For 75A titanium the equi-cohesive temperatures vary from 720°F for a 100 hr rupture life to 1020°F for a rupture life of 0.1 hr. Titanium undergoes a strain-aging behavior in hot tensile testing around 200° to 400°F.

There is little known about the creep-rupture properties of titanium and its alloys. While the feeling at present is that titanium does not have outstanding creep-rupture properties, this is probably due only to the scarcity of real information and the meagerness of alloys of a sufficiently complex nature. There is need for general information regarding the nature of the creep behavior of titanium to determine how it responds to time-tempeature effects under load. An equally important need exists to determine the role of the atmosphere on the creep behavior.

The stress-rupture data were obtained by using commercially pure (75A) titanium in the fully annealed condition. The annealing procedure consisted of heating centerless-ground bar stock, ¼ in. in diam, at 1560°F for 2 hr followed by air cooling. Hardness readings subsequent to annealing ranged from 170 to 180 VHN indicating a fully soft condition. The bars were machined into test specimens 0.160 in. in diam by 1 in. gage length. The depth of machining was sufficient to remove all surface contamination due to the annealing treatment.

The test equipment has been described elsewhere[1] and meets ASTM requirements for all measurements.

All the stress-rupture tests except one were run in air. The times for these tests varied from approx. 0.01 to 600 hr through the temperature range 700° to 1400°F. Tests that were expected to run less than 1 hr were loaded with a hydraulic jack in order to establish an optimum and standardized loading technique.

TABLE I

CREEP-RUPTURE DATA FOR 75A TITANIUM

	Stress (psi)	Life (hours)	Creep Rate (pct/hr.)	Elong. (pct)	Red. in Area (pct)
700°F	25000	613.4	0.014	20.0	83.5
	30000	141.5	0.021	11.4	84.0
	32000	0.16	0.117	13.7	81.0
800°F	15000	181.5	0.08	25.5	88.5
	17500	87.7	0.024	26.1	87.0
	20000	20.8	0.20	21.0	86.1
	25000	11.8	0.35	18.8	84.0
	27000	7.0	2.5	17.3	83.5
	28000	6.2	2.8	15.9	82.6
	29000	1.8	6.8	14.3	82.1
	30300	0.017	81.0	13.8	82.0
900°F	7000	303.2	0.14	81.2	93.8
	10000	68.0	0.4	70.0	91.4
	15000	7.7	2.2	63.0	89.3
	17500	4.28	3.5	51.3	86.7
	20000	1.13	9.6	25.0	86.1
	22000	1.01	14.7	42.1	88.0
	24000	0.60	24.0	31.0	84.1
	25000	0.22	135.0	29.6	85.5
	26000	BOL*	.....	28.2	82.3
1000°F	6000	30.3	0.6	100.1	95.0
	7000	13.2	1.3	53.9	94.6
	8000	6.0	4.0	73.8	93.4
	10000	2.3	8.8	50.0	91.3
	15300	0.43	80.0	84.7	88.5
	18000	0.18	154.0	50.0	88.0
	20000	0.067	570.0	38.0	87.3
	21000	BOL*	.....	32.4	86.4
1100°F	3000	90.5	0.32	100.0	96.0
	5000	7.5	0.31	103.0	95.2
	6500	2.01	11.2	106.0	95.1
	8000	1.1	128.0	141.0	95.4
	12500	0.12	680.0	82.0	91.0
	14000	0.07	740.0	52.2	91.0
	14885	0.048	1050.0	48.8	90.5
	16000	BOL*	.....	44.0	89.3
1200°F	2080	48.3	0.7	80.0	94.0
	3500	4.7	7.4	115.0	94.8
	5000	1.02	23.0	128.0	95.5
	7000	0.18	480.0	82.9	95.1
	10000	0.039	2300.0	91.3	93.2
	11000	0.012	7800.0	91.4	93.1
1300°F	1750	12.36	.....	53.3	95.0
	2000	11.03	.....	136.0	95.0
	2250	5.1	.....	85.4	95.0
	2500	2.1	.....	88.7	95.0
	4000	0.45	.....	97.2	95.0
1400°F	1250	19.5	.....	72.8	95.0
	1500	6.57	.....	71.7	95.0
	1750	3.56	.....	82.5	95.0
	2000	1.30	.....	65.7	95.0
	3500	0.2	.....	128.0	95.0

* Broke on loading.

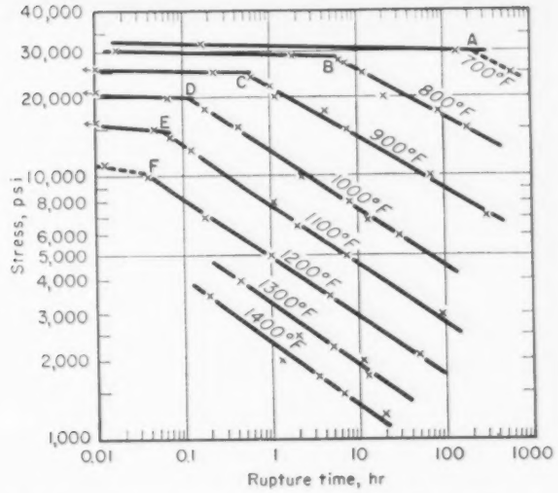

FIG. 1—Log stress versus log rupture time plot for annealed commercially pure titanium.

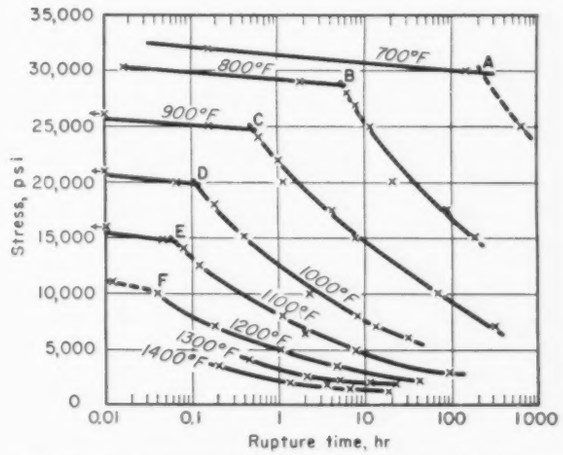

FIG. 2—Stress versus log rupture time for annealed commercially pure titanium.

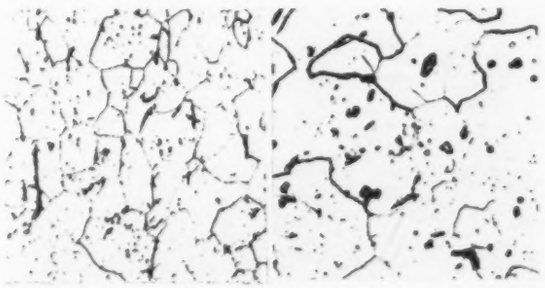

FIG. 3—Effect of temperature and time at temperature on the microstructure of 75A. Original structure still present at left, extensive grain growth has occurred, right. Etch HF plus HNO_3, 500X. Left, 600 hr, 700°F. Right, 50 hr, 1200°F.

In order to obtain some limited stress-rupture data for temperatures at and below 700°F, hot tensile tests were made using a technique modified from the one described above. This involved moving a beam weight at a constant rate of stress until rupture occurred. The time for these tests was about 30 min; they were conducted from room temperature to 700°F.

Table I lists the data accumulated from the stress-rupture tests. Log-log and semi-log plots were made of stress versus rupture-life. The isothermal points were then connected by best straight line segments and are shown in Figs. 1 and 2, respectively.

It was found that at each temperature from 700° to 1200°F inclusive, the points were best connected so as to form two distinct segments. The breaks in these curves (marked by the letters

"Appreciable grain growth was evident in specimens tested at 1200°F and higher for more than 30 hr . . . Time temperature relationships . . ."

A through F in Figs. 1 and 2) indicate the zones at which titanium is probably undergoing a change from the low temperature granular type behavior to the high temperature intergranular type.

Although the bulk of the evidence for the presence of two types of fractures was based on the shapes of the curves, there was additional evidence from microscopic examination. This method of examination was made difficult, however, by the extremely fine grain structure of titanium and the necking tendency of the metal. Appreciable grain growth was evident in specimens tested at 1200°F and higher for more than about 30 hrs which made it easier to note the change in the mode of fracture.

Fig. 3 shows the original fine-grained structure, persisting even after 600 hrs at 700°F and the extent of the grain growth found after 50 hrs at 1200°F. Only in these relatively coarse structures was it possible to distinguish somewhat between the two types of fractures. Fig. 4 shows the fracture occurring in a specimen tested at 1200°F with a rupture life of 0.012 hr while Fig. 5 shows the fracture occurring in a specimen tested at 1200°F for 48.3 hrs.

The transition in deformation and fracture (the 1200°F curve in Fig. 1) occurs between these two tests. Marked grain growth has occurred in Fig. 5 at the fracture. In Fig. 4, even with a reduction of area of 93.1 pct, the grains are not deformed. This would indicate that recrystallization may have occurred at the fracture. The fractures are not readily identified as to transcrystalline or intercrystalline.

The time-temperature relationship of the equi-cohesion zone was plotted and is shown in Fig. 6. Incidentally, the points A through F from Figs. 1 and 2 fit the curve of Fig. 6 equally well. Extrapolation of this parabolic-type curve indicated that at 600°F equi-cohesion would not occur sooner than about 35,000 hrs, signifying that a significant and rather sharp decrease in load carrying capacity and creep resistance would not occur in less than this time.

The slopes of the individual segments were plotted as a function of the logarithm of the absolute temperature. Fig. 7 shows this plot. The segment to the right of the equi-cohesion zone A at 700°F (Figs. 1 and 2) is dotted. This part of the curve was drawn on the basis of the extrapolated value to 700°F obtained from Curve II, Fig. 7, and may be considered the most accurate representation pending further tests. Extrapo-

TABLE II

HOT TENSILE TEST DATA

Temperature (°F)	Ultimate Strength (psi)	Elong. (pct)	Red. in Area (pct)
Room Temperature	77700	17.1	62.0
200	65000	27.5	42.5
300	55000	30.0	66.0
400	46000	36.9	73.0
500	39500	22.0	76.7
600	36500	22.3	79.0
700	32500	21.4	81.5

TABLE III

STRESS AT ZONE OF EQUI-COHESION

Temperature (°F)	Log-log Rupture Life (Fig. 1)	Semi-log Rupture Life (Fig. 2)	Log-log Minimum Creep Rate (Fig. 11)
700	29600	29800	30000
800	28700	28700	24800
900	25000	24800	24400
1000	19800	19700	19000
1100	14700	14600	15100
1200	9870	10000	9100

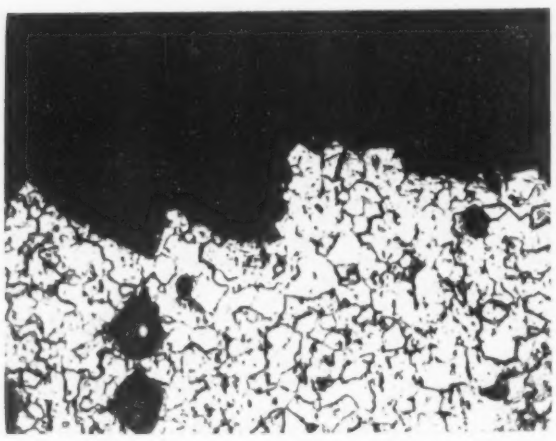

FIG. 4—Fracture edge after creep rupture test at 1200°F for 0.012 hr. Note small grain size and presence of holes. Grains relatively undeformed even after 93.1 pct R. A.

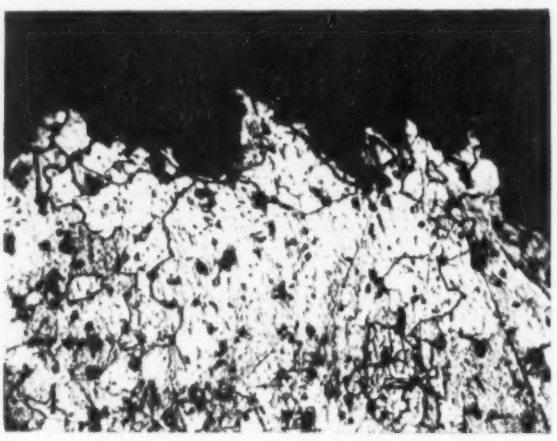

FIG. 5—Fracture edge after creep rupture test at 1200°F for 48.3 hrs. Note recrystallized grain size. HF plus HNO_3 etch. Mag., 500X.

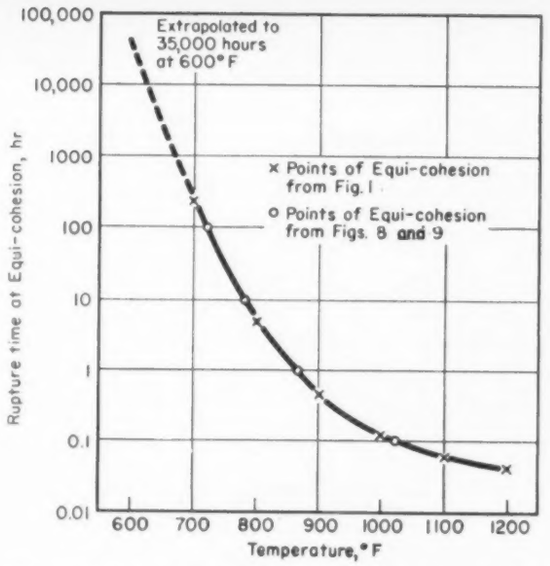
Extrapolated to 35,000 hours at 600°F
× Points of Equi-cohesion from Fig. 1
o Points of Equi-cohesion from Figs. 8 and 9
Rupture time at Equi-cohesion, hr
Temperature, °F

FIG. 6—Plot of rupture time for equi-cohesion versus temperature. Dotted line extrapolated to 35,000 hr.

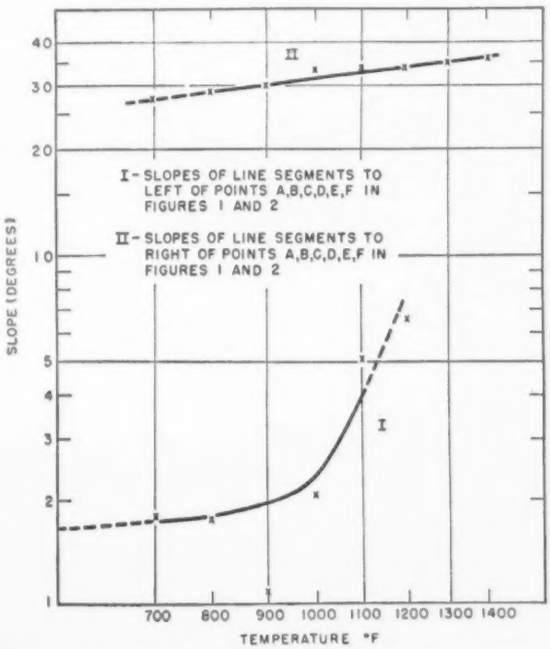
I - SLOPES OF LINE SEGMENTS TO LEFT OF POINTS A,B,C,D,E,F IN FIGURES 1 AND 2
II - SLOPES OF LINE SEGMENTS TO RIGHT OF POINTS A,B,C,D,E,F IN FIGURES 1 AND 2
SLOPE (DEGREES)
TEMPERATURE °F

FIG. 7—Slopes of straight line segments (from Fig. 1) versus log T (absolute). Actual temperatures in degrees Fahrenheit are shown by individual points.

lation of Curve I to low temperature is is significant in that it gives an indication of the flat slope of the stress-rupture curves in this range. The upward sweep of Curve I suggests that the slopes of the low temperature portions of the log-log plots of Fig. 1 (to the left of points A, B, C, D) and of the high temperature portions of the curves of Fig. 1 (to the right of A, B, C, D) are approaching each other at extremely short rupture times. The maximum temperature of intersection would be expected to be the transformation tempeature of titanium.

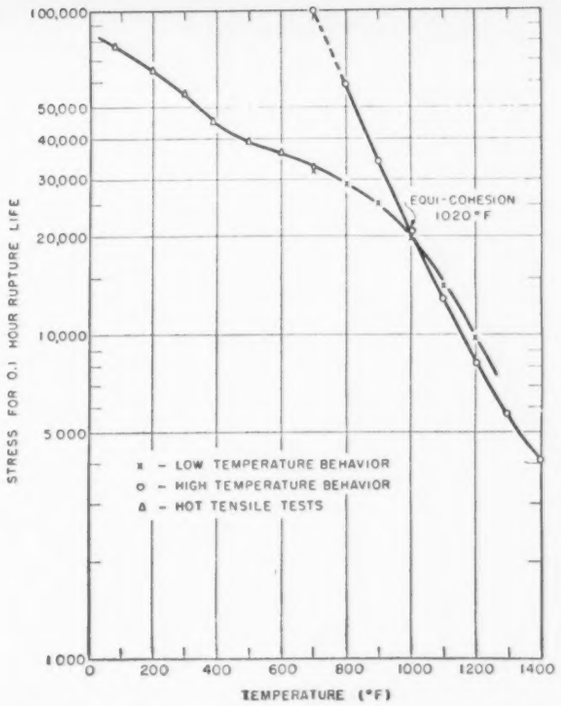
STRESS FOR 0.1 HOUR RUPTURE LIFE
EQUI-COHESION 1020°F
x - LOW TEMPERATURE BEHAVIOR
o - HIGH TEMPERATURE BEHAVIOR
Δ - HOT TENSILE TESTS
TEMPERATURE (°F)

FIG. 8—Plot of stress for 0.1 hr rupture life versus temperature for both high and low temeprature behavior.

Plots were then made showing the relationship between stress and temperature necessary to have rupture occur after 0.1, 1, 10, and 100 hrs. These plots include both the high temperature and low temperature behavior zones extrapolated to the proper time coordinates when necessary. These are shown in Figs. 8 and 9. The intersections of the two lines by definition were taken as equi-cohesion points and are shown in the curve in Fig. 6 to illustrate the agreement.

In order to extend the short-time tensile strength data to temperatures below 1290°F, it was decided to run tests under conditions similar to those by which the 0.1 hr fracture curves, Fig. 8, were obained. This was accomplished by increasing the applied load at a constant rate on specimens maintained at temperatures from 200° to 700°F. The initial load was estimated so as to give a total testing time of approx. 0.5 hrs. This discrepancy in time was considered unimportant because of the extremely flat slopes of the stress-rupture curves at these temperatures. The final stress prior to fracture was recorded and plotted as a continuation of the low-temperature type curve in Fig. 8. Finally, a room temperature tensile test was made and this was added as a final point on the curve. Table II lists the data accumulated from these tests.

The curve in Fig. 8 undergoes a slight inflection between 200° and 400°F. According to Carpenter and Robertson[2] this can be ascribed to a strain-aging effect that tends to increase the resistance to deformation. Further evidence of this strain-aging effect is shown in Fig. 10. Here the reduction in area and total elongation were plotted as a function of temperature for the hot

"Surface condition and test atmosphere play a large role in the receptive life of titanium . . ."

tensile tests and for the stress-rupture tests for 0.1 hr fracture. Fig. 10 shows a minimum in the reduction in area but also shows a maximum with appreciable scatter in elongation. The part of the curves representing the high temperature type fracture have been dotted because of the inadequate information regarding the ductility of titanium through this temperature range.

Fig. 11 shows a log-log plot of minimum creep rate versus stress. It should be emphasized that because of the limitations of the equipment, the minimum creep rate measurements are approximate values and any interpretations of these curves should be done bearing this fact in mind. Table III lists comparative values of equi-cohesion as obtained from information shown in Figs. 1, 2, and 11.

It has been well established that the mechanical properties of titanium are profoundly effected by the presence of small amounts of oxygen and nitrogen. In recognition of this fact, the stress-rupture properties of titanium, particularly at higher temperatures, have been carefully observed in a few tests in an attempt to detect any influence that surface reactions with O_2 and N_2 might have. A series of test bars were prepared and tested under a variety of conditions to evaluate the role of the surface or of the test atmosphere. These test data are shown in Table IV.

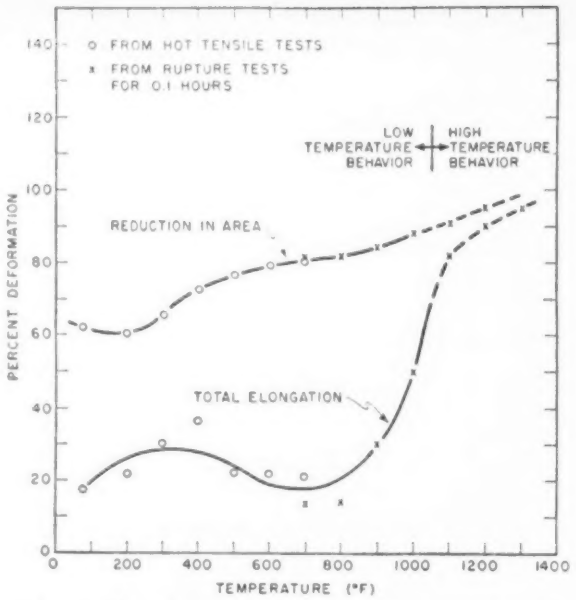

FIG. 10—Plot of pct deformation versus temperature for hot tensile tests and 0.1 hr rupture tests.

TABLE IV

RUPTURE LIFE OF 75A

No.	Treatment and Test	Stress (psi)	Temp. °F	Rupture Life-Hours	
				From Fig. 1*	Actual
1	Normal treatment. Tested in helium.	6000	1000	30	8.5
2	Nitrided 4.5 hrs at 1595°F. Tested in air.	6000	1000	30	69.0
3	Heated in air 24 hrs at 1300°F. Tested in air.	10000	900	65	85.0
4	Normal treatment. Tested in air.	1300	1200	400	1465.0

* Life based on a fixed test procedure for all tests made in air and reported in Table I and Fig. 1.

From Table IV it is evident that the surface condition and test atmosphere can play a large role in the rupture life of titanium tested at above about 900°F when the surface to volume ratio of the test specimen is large, such as would be true of sheet-type specimens.

At 1000°F, testing in helium materially decreased the rupture life compared to the life

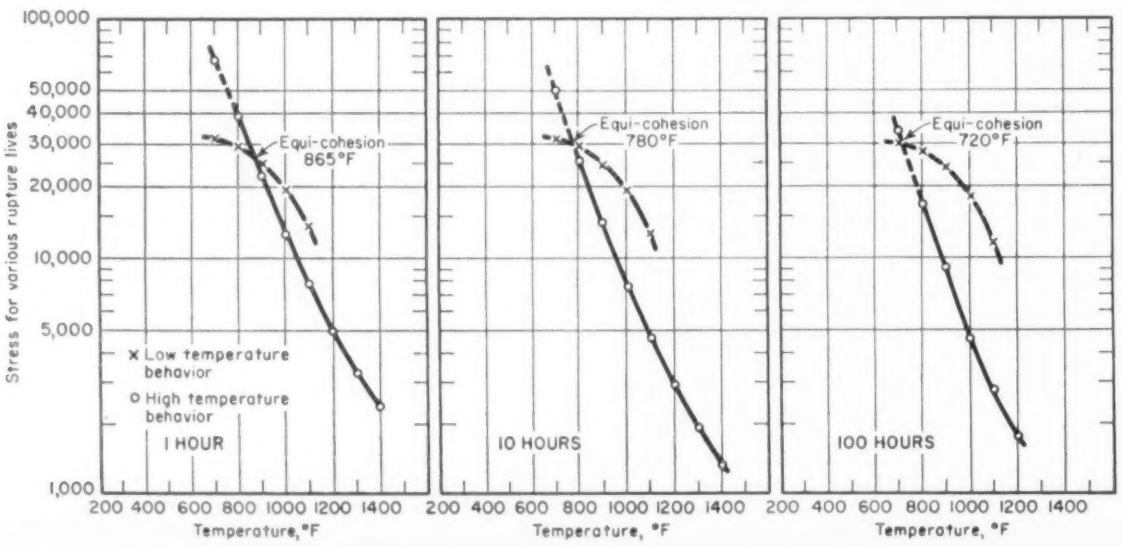

FIG. 9—Plot of stress for 1, 10 and 100 hr rupture life versus temperature. The equi-cohesion temperature is indicated by the intersection of the high temperature behavior line and each of the three different time rupture curves.

expected of a test made in air, whereas specimen No. 2 nitrided before testing to yield a thin case of about 0.001 in. improved the life markedly. Even prior heating in air from 24 hrs at 1300°F (specimen No. 3) resulted in increased rupture life when tested at 900°F. The prior treatment was sufficient to dissolve some oxygen.

Specimen No. 4 was run at 1200°F at a relatively low stress to see if progressive oxidation would result in increased life over that predicted by extrapolation of the curve for 1200°F in Fig. 1. The increase in rupture life was extremely large, from 400 to 1465 hrs. Some grain growth also resulted in the test so that some of the increased rupture life may be due to this.

Based on the above results and on the evidence in Figs. 1 and 7 of the almost parallel nature of the rupture life curves with decreasing stress at high temperatures, a closer examination of role of the test atmosphere was warranted. For this purpose the analysis of Larson and Miller[3] was adopted in which a plot of log stress versus a time-temperature parameter (K) is made of the stress-rupture data.

Fig. 12 shows the plot of log stress versus K where:

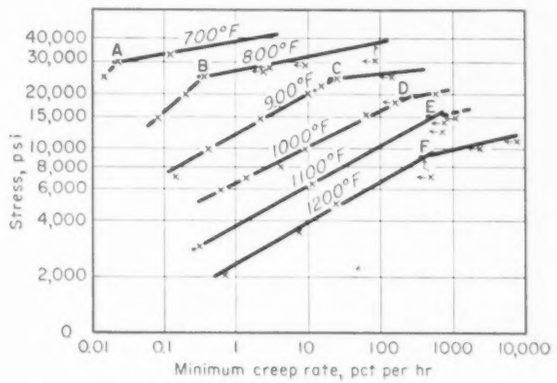

FIG. 11—Plot of log stress versus approximate log minimum creep rate up to 10,000 hr.

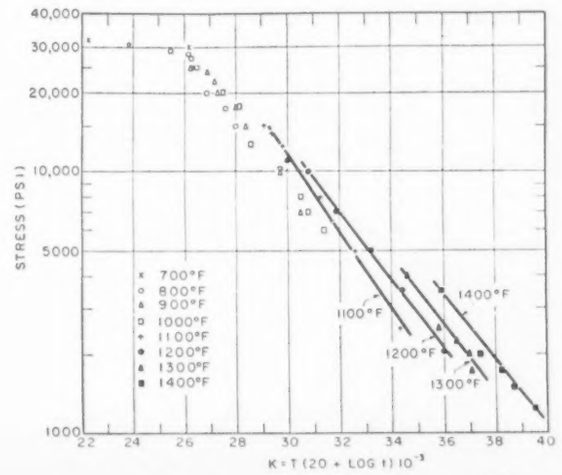

FIG. 12—Plot of log stress versus parameter (K).

TABLE V

HARDNESS READINGS FROM RUPTURED TEST BARS

Temp. (°F)	Rupture Life (Hours)	Vickers Hardness Distance From Surface					
		0.0002 in.	0.0006 in.	0.0010 in.	0.0014 in.	0.0018 in.	Core
900	303.2	140	195	185	165	190	175
	68.0	130	175	170	160	200	175
	0.22	142	190	195	235	180	165
1000	30.3	195	135	170	240	205	175
	13.2	150	210	195	190	195	175
	0.067	150	195	185	190	195	165
1100	90.5	135	170	165	160	175	175
	7.5	155	170	175	180	190	180
	0.048	155	165	190	185	175	175
1200	48.3	155	140	170	165	170	170
	4.7	170	190	195	185	175	175
	0.012	215	195	190	225	205	175
1300	12.4	230	205	220	210	188	185
	11.03	170	170	170	195	150	170
	0.45	195	190	205	225	205	195

$$K = T\ (2\ 0 + \log t)$$

where T = absolute temperature (°R)

and t = rupture time in hours

It is quite evident in Fig. 12 that the test points at temperatures of 700° to about 1000°F fit a fairly common curve without appreciable scatter. Progressively then, the points obtained at 1100° through 1400°F show a greater and greater positive deviation. This is contrary to normal creep rupture behavior where the points fall at lower values of the T-t factor K with increasing temperatures. Any instability which prevents an increase in slope is an improvement in strength over the normal deterioration of the metal.

Vickers hardness measurements were taken across transverse sections of the specimens to determine the amount of diffusion taking place at various times and temperatures. The hardness obtained are listed in Table V. The scatter is large but this scatter is not in excess of what is expected for commercially pure titanium. Unfortunately, there is no evidence of a distinct hardness increase in this range which explains the evidence of improved life shown in Fig. 12.

ACKNOWLEDGMENTS

The authors wish to express appreciation for the assistance of Mr. Ralph Kimble and James Wyatt and to the Bureau of Ships under whose sponsorship this research was made possible.

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[2] Carpenter and Robertson: *Metals*, Oxford University Press, 174-184, (1944).

[3] Larson, F. R. and Miller, J.: "A Time-Temperature Relationship for Rupture and Creep Stresses." Trans. ASME, **74**, No. 5, 765, July, 1952.

[4] Grant, N. J.: Discussion of paper by Larson and Miller, ref. 3 above, 771.

Gas replaces salt bath—

Fast gas furnace ANNEALS AT NORMALIZING TEMPERATURES

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Selas Corp., Philadelphia
and
S. L. Yarborough
Chief Engineer
Rheem Mfg. Co.,
San Pablo, Calif.

Fast heat with radiant gas above the critical temperature has replaced salt bath annealing at one shop. The heating time has been reduced from 1 hr to 2 min permitting higher production rates of 81 mm mortar shells. Annealed hardnesses obtained by the new method are similar to those produced by salt bath methods. The microstructures are not the same; pearlite colonies are smaller and more evenly distributed in gas annealed shells.

A revolutionary departure from conventional practice of process annealing cold-formed, low-carbon steel is contributing importantly to the production of artilllery ammunition components. This new annealing method, applied between cold forming operations of drawing and tapering an 81 mm mortar shell, involves fast heating with radiant gas at temperatures above the critical instead of slow heating in salt below the critical. The shortened heating time (1 hr reduced to 2 min) permits the heat processing to function as an integral part of the production line. In addition, the radiant-gas furnace shown in Fig. 1 uses less floor space, decreases maintenance cost, improves cold-formability and simplifies shell handling.

At the San Pablo, Calif., ordnance plant of the Rheem Mfg. Co., these 81-mm mortar shells are being produced at high production rates by a new process of hot cupping and cold drawing. The starting point in the processing of this shell is a billet 2½ in. diam x 3⅛ in. in length, saw cut from hot-rolled bars of SAE 1010 steel. In three blows the billet heated to 2000°F is blocked, extruded and sized to produce a cup. After cooling and descaling the cup is cold drawn to elongate the upper walls and cold nosed to form final nose contours. The shell is then annealed, followed by flash pickling and surface treatment which prepares it for the final draw. A second anneal and surface treatment, after final draw, then prepares the shell for the final forming operation of tapering the tail.

To fit these annealing operations into the production line, Selas rotary-type furnaces are employed. Each shell is supported in a rotating fixture as shown in Fig. 2 and conveyed through the circular furnace tunnel so that anneal-heat is confined to the upper 4½ in. at the mouth end. This is the portion to be softened for subsequent tapering illustrated schematically in Fig. 3.

There are 40 shell stations, of which 12 are under heat. For the noted furnace production rate each shell is under heat for 1 min and 47 sec. With a furnace temperature of 1970°F this heating time produces shell temperatures of 1750°F at the mouth end and 1150°F 4½ in. from the mouth end due to the varying wall thickness. Air cooling from these peak temperatures takes place on the conveyer outside the furnace cham-

ber for 36 sec of travel. The shells are then removed and further air-cooled in conveying to the pickling bath. This short heating cycle is most noteworthy when compared with the former salt bath treatment requiring a 13 min hold at 1250°F and an overall time in the bath of 1 hr. Fig. 4 indicates the similarily of anneal-effect for both methods in the plot of Rockwell-B hardness along the shell annealed by gas and salt bath methods.

The primary purpose of annealing steel between cold forming operations is to recrystallize the distorted, work-hardened ferrite grains and thus restore the original softness. Most deep drawing operations require spheroidized steel to minimize the hardening effect of the carbon present in establishing this original softness. For

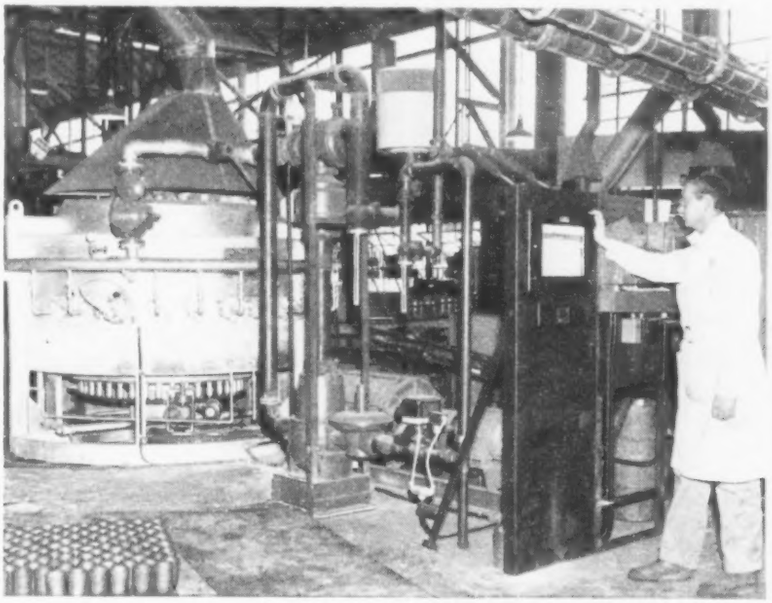

FIG. 1—Selas rotary furnace at Rheem plant which anneals 672 81 mm shells per hr. The combustion control equipment which prepares the air-gas fuel mixture and controls the furnace atmosphere is shown between the control board and the furnace. A compressor delivers the premixed fuel to the furnace under 3 psi pressure.

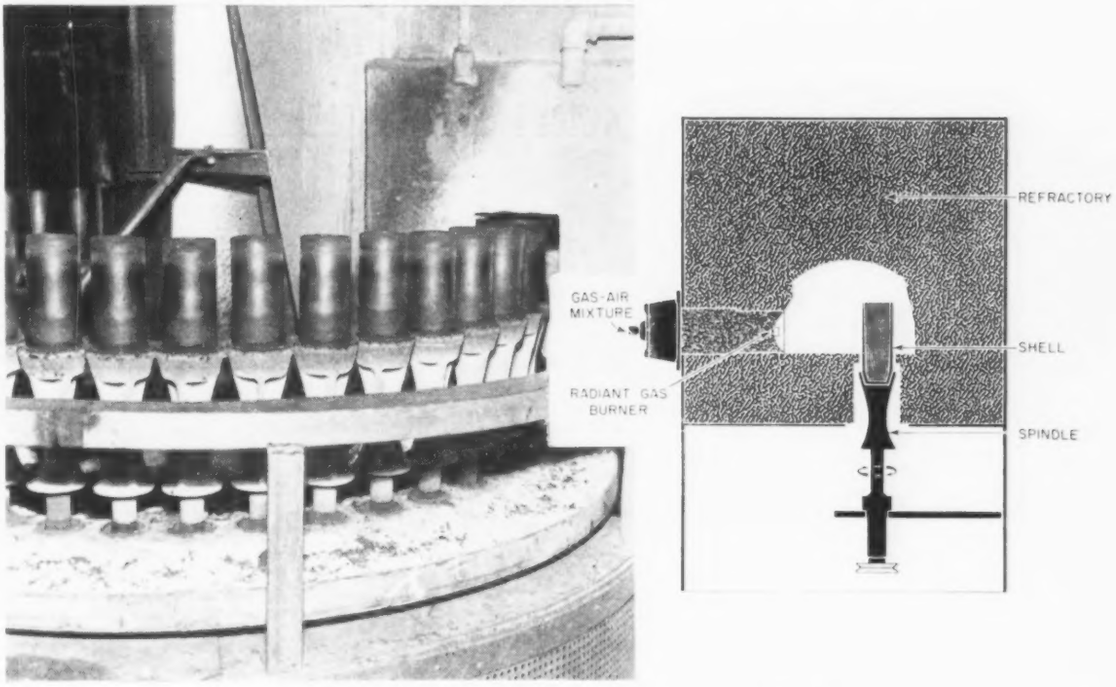

FIG. 2—Shells mounted on the furnace conveyer enter the combustion chamber, shown in schematic cross section at the right. The spindles on which the shells are mounted rotate continuously. Furnace conveyer speed is about 6½ fpm.

"Permits recrystallation of the ferrite grains but avoids alteration of the carbide . . ."

such steel a process anneal is necessary, wherein the temperature is held close to, but below the lower limit of the transformation range. This temperature, in the range of 1200°F to 1300°F, permits recrystallization of the ferrite grains but avoids alteration of the carbide form which might constribute a hardening effect.

Conventional process annealing practice employs salt baths or electric-oven type furnaces in which long time cycles are required to promote recrystallization at temperatures below the critical. With the recent development of the cold extrusion process and the combination hot-cup and cold-draw process it has been possible to substi-

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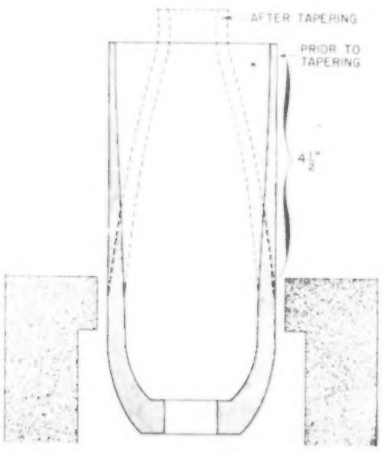

FIG. 3—Shell shown in position in the furnace chamber. Only the top 4½ in. is exposed to heat. The solid drawing shows the shape of the shell as annealed, the dotted lines indicate the final shape after tapering.

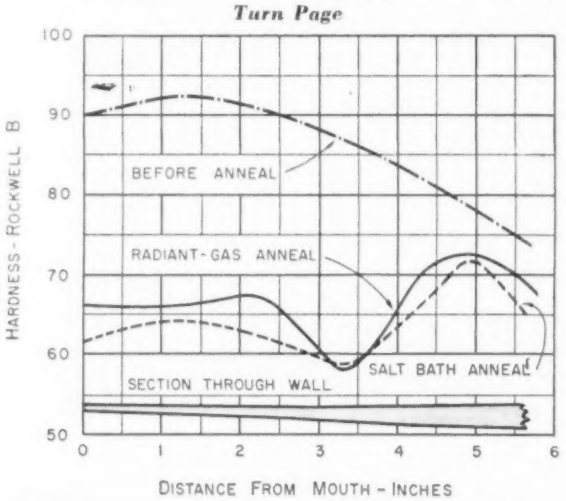

FIG. 4—Comparison of hardness over the length of the 4½ in. heated section of the shell as annealed by gas heating and salt bath heating methods.

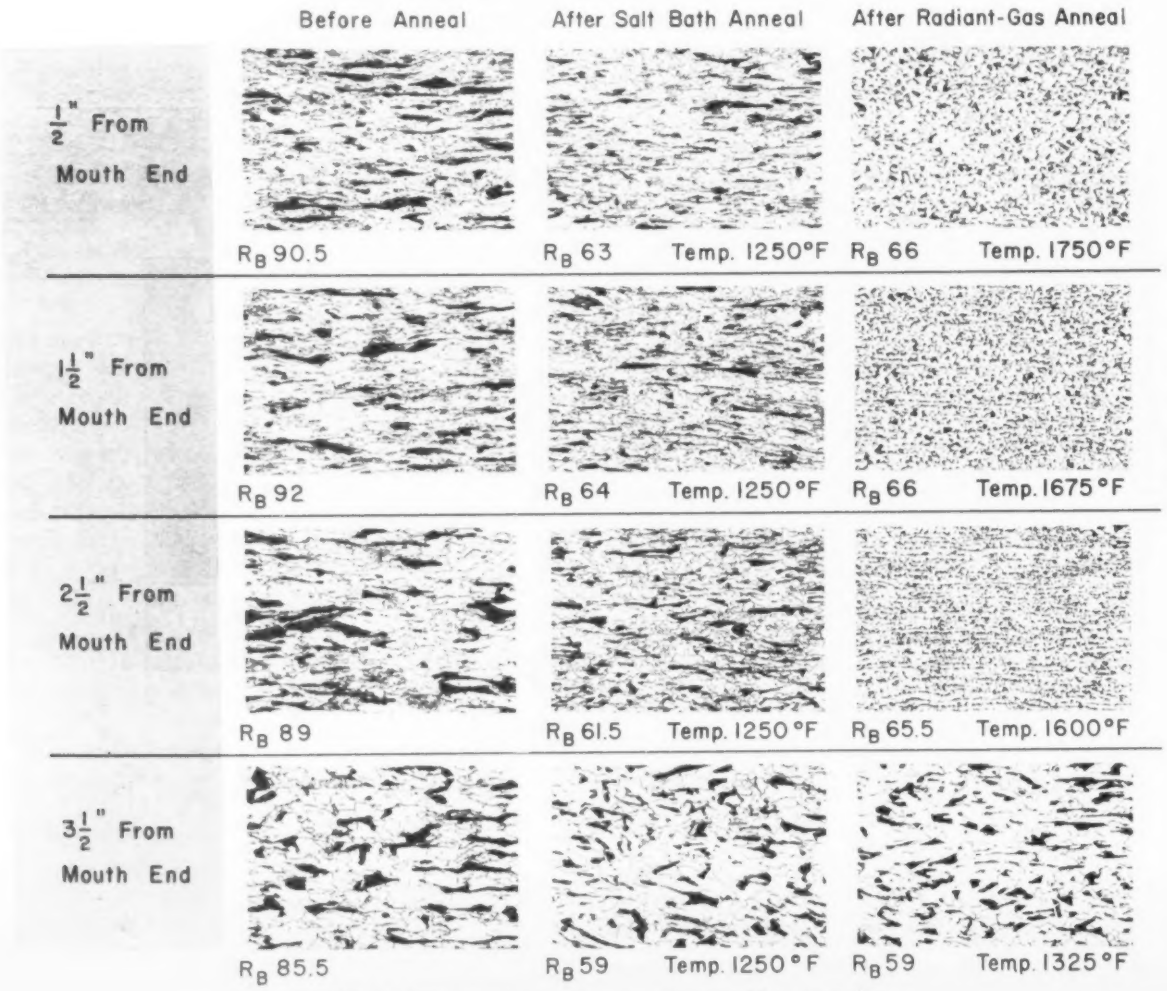

FIG. 5—Microstructures taken at various positions from the mouth and illustrate the type of pearlite produced by both annealing methods.

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"Fuel costs are low since a short heating cycle is employed and the heating is confined to that portion of the shell where softening is required."

tute hot rolled bar stock for the more expensive spheroidized plate material. Carbon in hot rolled bar is in the form of lamellar pearlite, developed during air cooling from rolling temperature, as opposed to the softer form of spheroidized carbides in the steel plate formally used. Thus, for hot rolled material the annealing operation between draws avoids the critical aspects of a process anneal.

Heating within or above the transformation range does not alter the pearlitic form of the carbides but merely changes their size and distribution. In such case the hardening effect of the carbon remains unchanged. Since the only consideration is that of recrystallization of the ferrite grain structure the annealing temperature may extend from approx. 1100°F to 1800°F. The higher temperatures hasten recrystallization and eliminate the necessity for a soak.

Annealing results

Referring again to the hardness curves of Fig. 3, annealing over a wide range of temperature by the faster radiant-gas method has produced results closely comparable to those for the salt bath anneal. The slight differences in hardness at various positions is attributable to differences in grain size as may be noted in the photomicrographs of Fig. 5. The essential requirement for a successful draw is that of a fully recrystallized, stress-free, ferrite grain structure. A uniform hardness after anneal is not important, nor is it possible, since it depends upon the degree of prior cold reduction which varies along the tapering shell wall.

Several significant advantages have resulted from use of this radiant-gas annealing method in addition to that, already mentioned, of the equipment fitting into the production line. The circular travel of the shells and the short-heating time permit a furnace construction which occupies considerably less floor space than the more conventional type furnace. Operation requires but one man who loads and unloads shells from the same position. Fuel costs are low since a short heating cycle is employed and the heating is confined to that portion of the shell where softening is required. Natural gas consumption is 990 cu ft per hr for the production rate of 672 shells per hr.

No special furnace atmosphere is required. The air-gas ration is maintained by the Selas Combustion Controller to avoid the presence of free oxygen in the products of combustion. This furnace atmosphere coupled with a short exposure to heat during annealing produces only an oxide film discoloration on the shell which responds readily to clean-up with a flash pickle. The resulting surface has proven superior to the salt bath annealed surface for adherence of the phosphate-soap drawing lubricant.

In Rheem's former practice, employing a salt bath anneal, the final tapering was performed in two stages. The radiant-gas anneal has enabled this forming to be done in one stage, shown in Fig. 6, eliminating one press and one operator. It is indicated that cold metal flow may be improved with fast heating in a manner not reflected in the usual hardness determinations.

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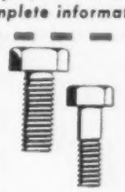

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"1035" Hi-Tensile Heat-treated steel.

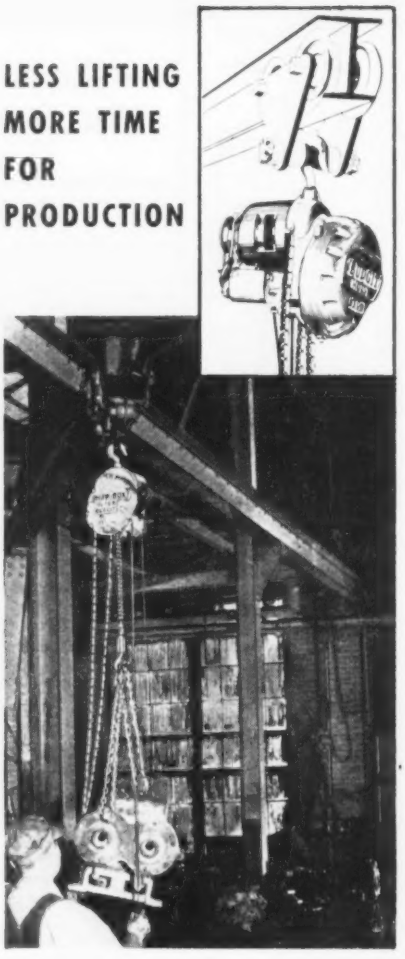
SQUARE AND HEX MACHINE SCREW NUTS
Semi-finished, hot pressed, cold punched.

LOCK NUTS
Economical, vibration proof. Can be used repeatedly.

COTTER PINS
Steel, brass, aluminum and stainless steel.

"1035" SET SCREWS
Cup point type, hardened and heat-treated.

LESS LIFTING
MORE TIME
FOR
PRODUCTION



Want greater output and lower costs? You get both with the 'Budgit' Electric Hoist! This powerful hoist speeds lifting — gives workers extra time to produce more. Women and older men — now helping turn out defense and civilian goods — praise its easy, safe, one-hand operation. And, the 'Budgit' works all day for pennies.

The portable 'Budgit' is a hang-up, plug-in hoist — ready for service as soon as unpacked. No extras to buy. No installation costs. Capacities: 250 to 4,000 lbs. A.C. and D.C. models. Priced from $119. Get all the facts. Send for Bulletin 391.

'BUDGIT' CORD REELS — increase the operating range of any hoist, portable tool, or mobile device having motors up to and including 1 H.P.

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Builders of "Shaw-Box" Cranes, 'Budgit' and 'Load Lifter' Hoists and other lifting specialties. Makers of 'Ashcroft' Gauges, 'Hancock' Valves, 'Consolidated' Safety and Relief Valves, 'American' Industrial Instruments.

Technical Briefs

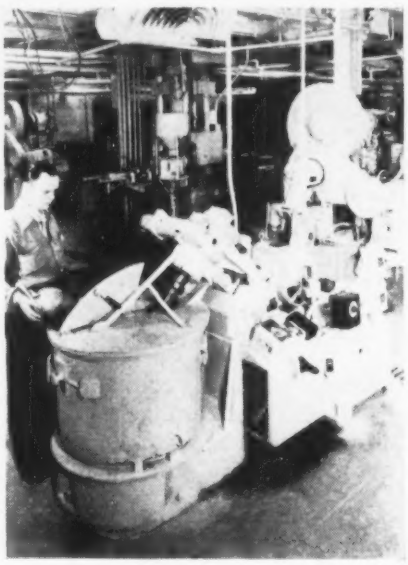
Engineering

ABRASIVES:

New 3-stage curing oven boosts grinding wheel output.

More uniform curing on high-speed grinding wheels is being achieved with a large, automatic, 3-stage curing oven recently installed at the Simmonds Abrasive Co., Philadelphia. The oven is designed to cure wheels molded of abrasives bonded with Bakelite phenolic resins with almost no variation in color, an important factor in grinding wheel sales.

Because of its size and continuous operation the oven's capacity is equal to that of nine conventional type batch ovens. The oven is divided into three chambers by sliding overhead doors which open simultaneously.



THOROUGH MIXING of abrasives and bonding resins is important step in manufacturing uniform, high-speed grinding wheels and abrasive cutting wheels.

Packed With Sand—Three, 5-tier cars carrying formed wheels packed with sand enter the first chamber, the doors of which are opened automatically.

After curing for 24 hr at 200° to 300°F, the cars move into the second chamber for heating at 360°F for another 24 hr period. Cars then go to a steady cooling chamber for 5 to 6 hr. Forty-eight hours after a batch enters the oven a new cycle is started.

This new oven is part of an expansion program at Simmonds Abrasive which has permitted a 50 pct increase in output. Other new features at the plant include a new type hydraulic mixing machine with a specially designed right-angle drive. The machine blends abrasive particles and wet grits, previously blended with Bakelite phenolic blend resins, for pressing into grinding wheel form.

Big Press — Other additions include 1000-ton hydraulic press, which shapes the mixtures of abrasives and bonding resins into wheels up to 36 in. in diam and 12 in. thick. The giant press will eventually have four stages, one on each side, to quadruple production of the large wheels.

Special controls for safety and efficiency permit operation of the press from only one stage at a time. An operator can adjust the pressure to requirements of his mold only after another pallet and mold have been taken out of the press.

HYDRAULIC PRESS, capacity 1000 tons, shapes big wheels used in abrasive cutting.

IF YOU WANT MORE DATA

You may secure additional information on any item briefed in this section by using the reply card on page 97. Just indicate the subject heading and the page on which it appears. Be sure to note exactly the information wanted.

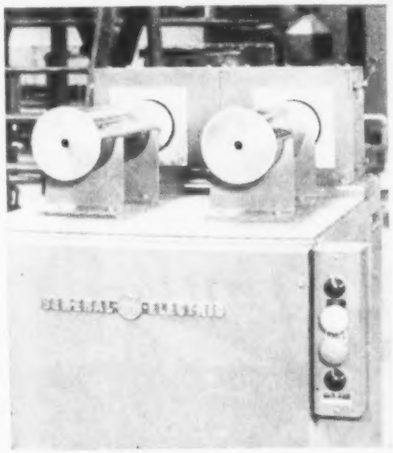
NNEALING:

Ammunition reclaimed with aid of induction heating units.

The Ordnance Ammunition Center of the U. S. Army at Joliet, Ill., will soon install mouth-annealing equipment at eight locations throughout the country in a dollar-saving program of reclaiming old 40, 75, 76, and 90 mm. ammunition.

Purpose of the program is to reload shells that have become unreliable because of age. To reclaim the outdated shells, the projectiles and powder are removed from the cartridge cases and the mouth of the brass casing softened by induction annealing.

Snug—This insures a snug fit against the grooves of the projectile when the cartridge cases are refilled and again crimped on the projectile.

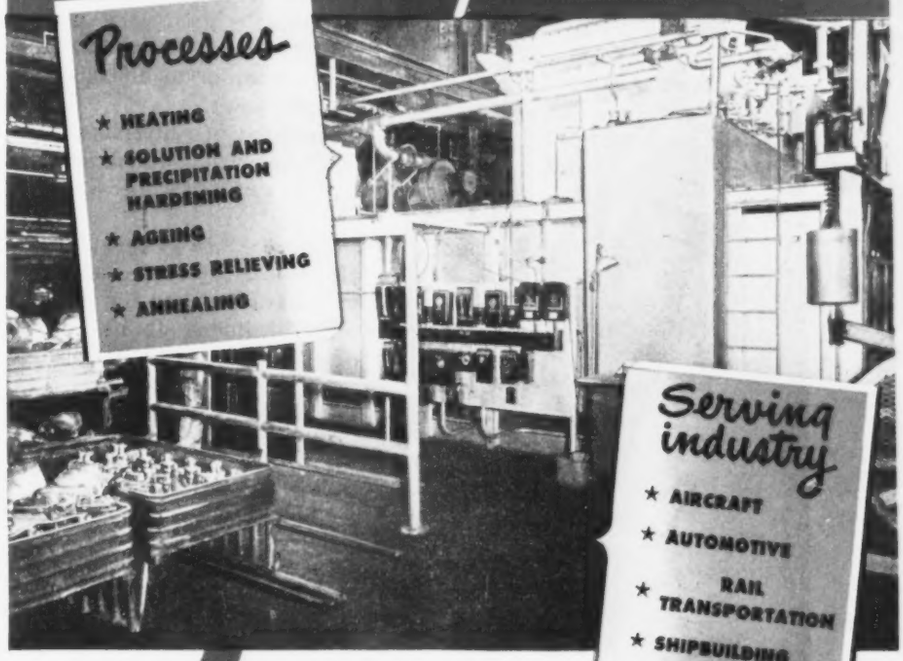


RECLAIMING overage shells is easier with this double induction heater. After explosive charge is removed and shell reloaded, rim of shell is annealed to assure better crimp seal on reloading.

Each of the eight installations will consist of a General Electric 30 kw, 10,000 cycle motor-generator set with controls, and two 2-position induction annealing machines designed to anneal cartridge case mouths at the rate of 600 per hr.

Heating Cycle—Two machines are used at each installation so one can cool and be reloaded while the other is going through the 11-sec heating cycle.

'Surface'



HEATING ALUMINUM cylinder head forgings at Tube Turns, Inc., Louisville, Ky. Surface Combustion convection heated slat conveyor furnace operates at 900 F, producing 4600 lbs/hr net.

Gas-Fired furnaces for

heat treating aluminum

Why use 'Surface' furnaces?

Surface Combustion developed the forced convection type of furnace, which provides maximum temperature uniformity for heat treating aluminum. Also, convection overcomes the reflective properties of aluminum, heating the charge faster and more uniformly than other types of heating. Gas-fired salt bath furnaces for the heat treatment of aluminum and aluminum alloys are also available for special applications.

If you have unusual production requirements, odd-shaped parts, particular shop practices, or space limitations, there's a 'Surface' heat treat furnace to meet your requirements.

Write today.

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- Stainless Steel
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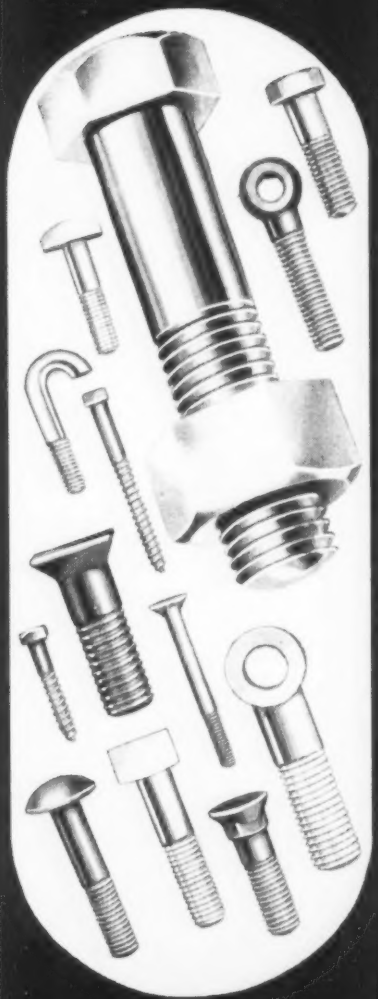

You can depend on a uniform Class 3 fit when you buy Pawtucket threaded fasteners. Standard items or specialties — all Pawtucket products are accurately made in standard dimensions or to your specifications. Heat treating with precision-controlled modern equipment.

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T.M. REG.

—Technical Briefs—

ROCKET NOZZLES:

Search for high heat resistant materials continues.

Spurred by continued demand for high heat resistant materials to function in the hot zones of jets and rockets, engineers of Norton Co., Worcester, Mass., have turned their attention to unusual refractory materials.

A number of materials show considerable promise for rocket nozzles and for rocket chamber liners.

Bonded—Silicon carbide bonded with silicon nitride has many properties ideally suited for rocket nozzles and liners. It has excellent erosion resistance, good thermal shock resistance, good oxidation resistance, good strength, low density (apparent density 2.6g per cc) and low thermal conductivity compared with graphite or metals. This material can be made in a wide variety of shapes and sizes.

Graphite alone is useful in certain applications for rocket nozzles or liners because of its light weight and high resistance to thermal shock. However, in many applications it is eroded too rapidly.

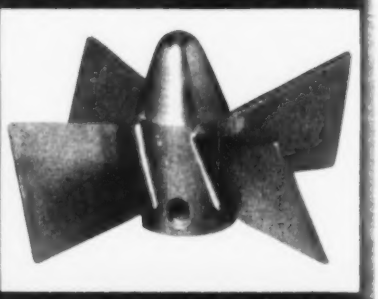
Coating—Coating graphite with a thin protective layer of silicon carbide formed at high temperature protects the graphite and increases its erosion resistance. With present equipment the Norton Company is prepared to manufacture such nozzles in a variety of shapes and sizes up to 28 in. in diameter.

Several refractory carbides, borides, and nitrides, some of which such as zirconium boride or titanium boride, may be suitable for rocket nozzle inserts are produced by the Norton Co. In general, they are characterized by extremely high melting points and excellent strength and erosion resistance.

Protective — A recent development is in the field of highly refractory crystalline protective coatings. The development consists of adherent highly refractory coatings of oxides such as aluminum oxide or stabilized zirconia formed on the surface of graphite or metals such as steels and aluminum.

Turn Page

Rocket Fuse



easy to make to military tolerances at low cost

IF . . . .

. . . You do it the easy way

It's made of mild steel . . . so just turn a simple part out of rod and blank 4 parts out of strip . . . thus

THEN jig the parts and . . . low temperature

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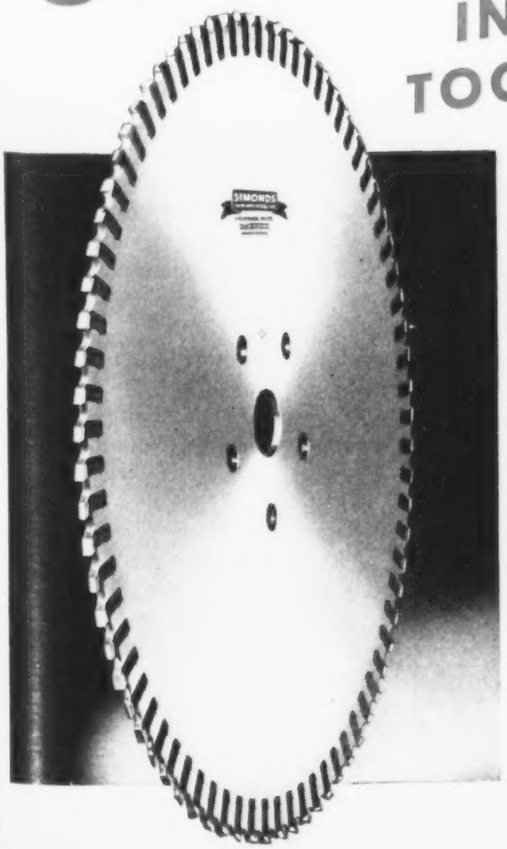
A Wedge for every tooth means Added Strength for SIMONDS

INSERTED-TOOTH SAWS



Here's the most rugged design of all metal-cutting saws . . . the tough saw-plate of special Simonds Steel, fitted with alternating square and beveled inserted teeth . . . *and with a wedge for every tooth*, to give that extra strength for heavy cutting. In fact, this saw is practically indestructible, for it can be readily repaired if damaged and restored to original efficiency by an average mechanic.

Yet Simonds Inserted-Tooth Saws have the same quick clearance as other Simonds Saws . . . and the inserted teeth cut a "Tri-vided" chip that falls free in 3 pieces.

For general heavy-duty work, this is *Industry's No. 1 Saw.* And for other types of work, Simonds also makes Circular Metal Saws in Segmental, Solid-Tooth and Carbide-Tipped types. So ask your Industrial Supply Distributor to secure for you the *unbiased* consulting of a Simonds Saw Engineer.

SIMONDS SAW AND STEEL CO.

FITCHBURG, MASS.

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon.
Canadian Factory in Montreal, Que.
Southern Service Shop in Meridian, Miss. (formerly J. H. Miner Saw Mfg. Co.)
Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.
Simonds Abrasive Co., Phila., Pa. and Arvida, Que., Canada

Why not use Perforated Metal?

This Wesix Electric Heater shows a typical application of Hendrick Perforated Metal, combining utility and attractiveness. The heater guard is 20 gauge steel, with 3/16" x 1½" side stagger perforations.

With facilities for producing any required shape and size of perforations in any commercially rolled metal, Hendrick invites inquiries from manufacturers who may be considering the use of perforated metal in connection with any of their products.

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Architectural Grilles
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Electric furnace car mounted on electric transfer car for completely automatic continuous heat treating system.

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—Technical Briefs—

FASTENERS:

Many factors affect selection of hex bolts, cap screws, nuts.

The new hexagon standards for bolts, cap screws and nuts, B18.2-1952 result of 5 years of intensive study, points up the continued problem facing engineers specifying this type of fastener.

Whether to use fine threads or coarse threads is not an easy choice. Only with a complete understanding of the functioning of screw threads and a careful analysis of all design, assembly, economic and other factors involved, can the correct selection be made. Some important considerations outlined by Industrial Fastener Institute are those which follow:

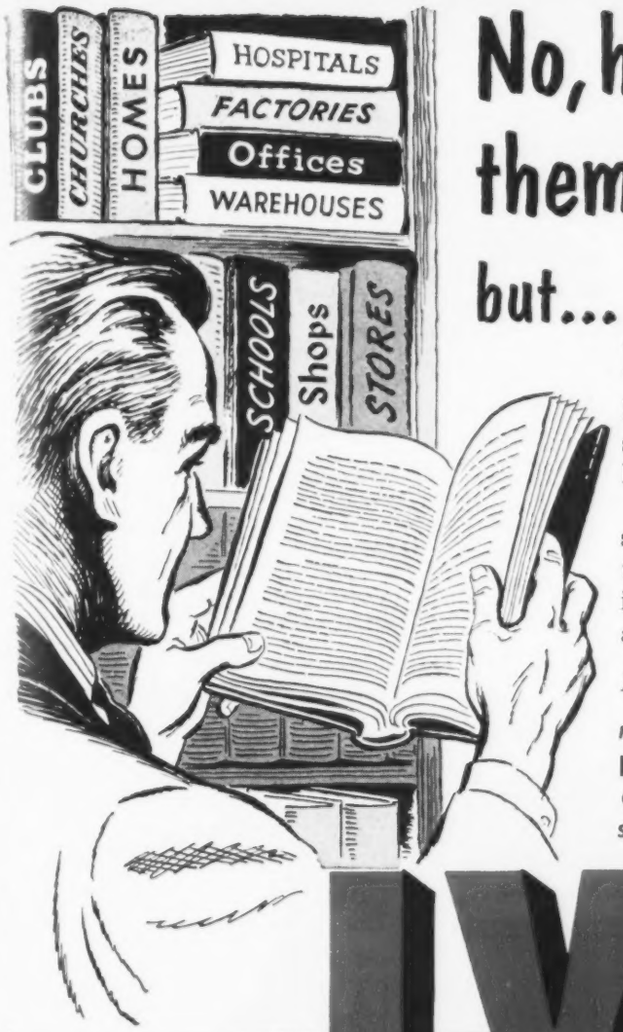
Torquing Effort—It is generally desirable to assemble bolts with a relatively high initial tension which usually is produced by wrenching the bolt head or the nut. A common misconception, and one of the original reasons for the introduction of fine threads, was the belief that with fine threads less torque effort would be required because of the smaller helix angle.

Recent mathematical analyses and laboratory tests prove that, because of high frictional losses, the coarse thread requires only about 3 pct more torque than fine thread which is too small to have significant effect on assembly practice.

Bolt Tension—Slotted nuts are frequently used for locking purposes, and in assembly the nut must be stopped at a point where a cotter can be inserted through the slots and through a hole drilled through the bolt.

The only adjustment of bolt tension is to turn the nut forward or backward to the next slot. This is a fairly large adjustment in terms of change in bolt tension, particularly in short bolts. Fine threads are an advantage as the change in bolt tension for a given nut rotation is only about 2/3 as much as with coarse threads.

Turn Page



No, he doesn't know them all like a book...

but... there's one phase of virtually every business which Lyon Steel Equipment Dealers know "from cover to cover." That phase has to do with helping their customers make the most out of steel equipment in terms of savings in time, labor and money.

A highly diversified line of more than 1500 standard Lyon items enables Lyon Dealers to meet the varying needs of business, industry and institutions—*better*. A very few typical products are shown below.

Lyon also has facilities for special contract work.

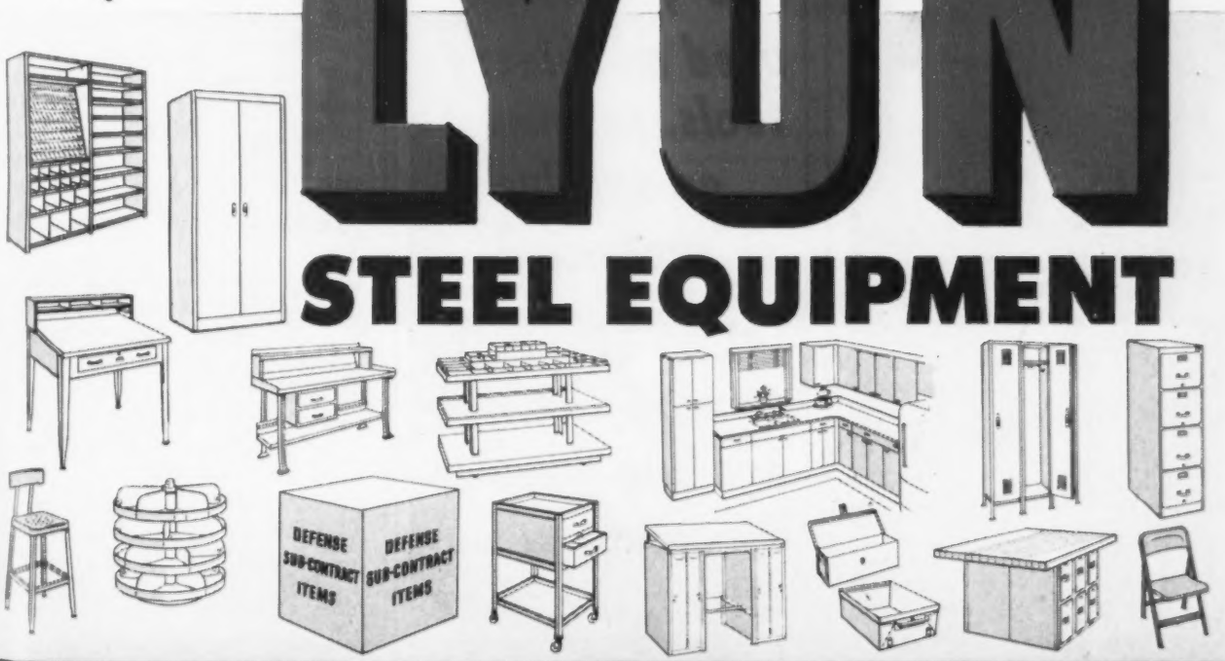
FACTORIES IN . . . AURORA, ILL., AND YORK, PA.

LYON METAL PRODUCTS, INCORPORATED

General Offices: 1136 Monroe Avenue, Aurora, Illinois

Sold Nationally Through Dealers and Branch Offices

LYON
STEEL EQUIPMENT



A PARTIAL LIST OF LYON STANDARD PRODUCTS

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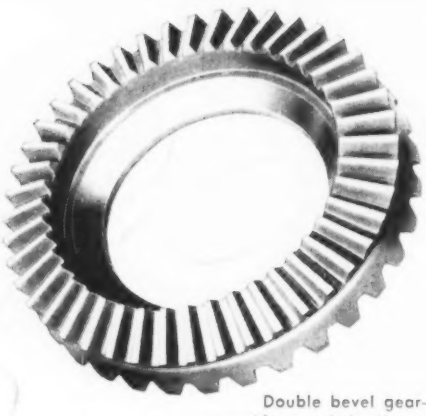
• Lockers	• Cabinet Benches	• Bar Racks	• New Freedom Kitchens	• Flat Drawer Files	• Folding Chairs	• Sorting Files	• Shop Boxes
• Stools	• Storage Cabinets	• Tool Boxes	• Toolroom Equipment	• Revolving Bins	• Work Benches	• Drawer Units	• Tool Trays
• Bin Units	• Drawing Tables	• Parts Cases	• Wood Working Benches	• Hanging Cabinets	• Bench Drawers	• Hopper Bins	• Shop Desks

Bramble-7700



Double bevel gear—used in post hole digger

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We are proud of our craftsmen, proud of our gears, proud of our reputation for quality. And we are proud of the fact that our customers can deal with us with complete confidence—an established, reputable firm with whom you, too, will enjoy working.

Spur	Internal
Helical	*Coniflex Bevel
Worm	Spiral Bevel
Herringbone	Spline Shaft

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Are you selling used machinery, tools, equipment or surplus materials?

Let an advertisement in The Iron Age help speed up the process by contacting the many buyers who look here for leads.

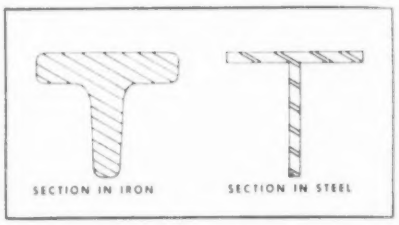
Technical Briefs

DESIGN:

Welded steel structures permit greater strengths at less cost.

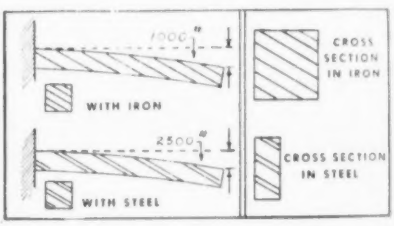
Proper welded design of machine components, in steel, often permits improved mechanical properties while effecting savings in materials.

Steel is credited with being 2½ times more rigid, 4 times stronger than run-of-foundry iron.



FOR EQUAL RESISTANCE to deflection steel needs only 40 pct of the section area of iron.

Savings—Initial savings in material weight alone often average as much as 70 pct on many products. The lower weight plus less cost per pound for steel can cut material expense as much as 95 pct. This price advantage in material



STEEL SECTIONS require only 25 pct of area of original iron design for equal, dependable strength.

leaves a generous margin in which to manufacture and still retain average savings of 50 pct or more.

The correct amount of steel for any machine member can be calculated by the same formulas used to determine cast designs. However, when converting a cast design to welded steel, engineering calculations can be simplified by the system of equivalent sections evolved by Lincoln Electric Co., Cleveland.

Safety Factors — Considering safety factors of 5 for steel and 8 for iron, the relative design strength of steel to gray iron can be based on the ratio of 4 to 1. Accepted average tensile strength of

steel by consultants is 60,000 psi.

Run-of-foundry gray iron runs about 24,000 psi. In designing for strength, therefore, the cross section in steel need only be 25 pct of the original iron sections, providing the same relative depths can be retained.

SAFETY FACTORS

	Cast Iron	Steel
Bases	8	5
Containers	6	4
Levers and Links	20	15
Cranks	9	6
Brackets	6	4
Gears and Flywheels	11	7
Flywheel Rims	20	8

Deflection — Since steel resists deflection 2½ times better than run-of-foundry gray cast iron, a steel component of unit cross section, for example, will support a load of 2500 lb whereas a similar component in cast iron supports only 1000 lb. When redesigning a component for steel, therefore, only 40 pct of the cross sectional area is generally required to duplicate resistance to deflection.

While safety factors accepted for standard design practice are 5 for steel and 8 for iron, the type of product and service expected often calls for further modification of values as indicated in the chart. The factors of safety shown are based on the use of the ultimate tensile strength in design.

New Coke Test Oven Developed

A new testing oven which determines in advance the kind of coke that a commercial oven will produce and also yields a coke very similar in quality to that produced commercially has been designed and successfully demonstrated by the Bureau of Mines. The test oven more nearly duplicates the carbonizing conditions of the larger-type commercial ovens than any test oven so far developed, it is reported.

The oven differs primarily from other existing ovens in that its width—17 in.—is nearly the same as the full-scale commercial models. Although its length and height are much smaller than the commercial, its width is greater.

"We'll get that babe out here every month if we can keep using Columbia Exl-die!"

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Producers of fine tool steels—High Speed Steels
Die Steels—Hot Work and Shock Resisting Steels
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Made of highest standards and uniform quality thus insuring maximum service.
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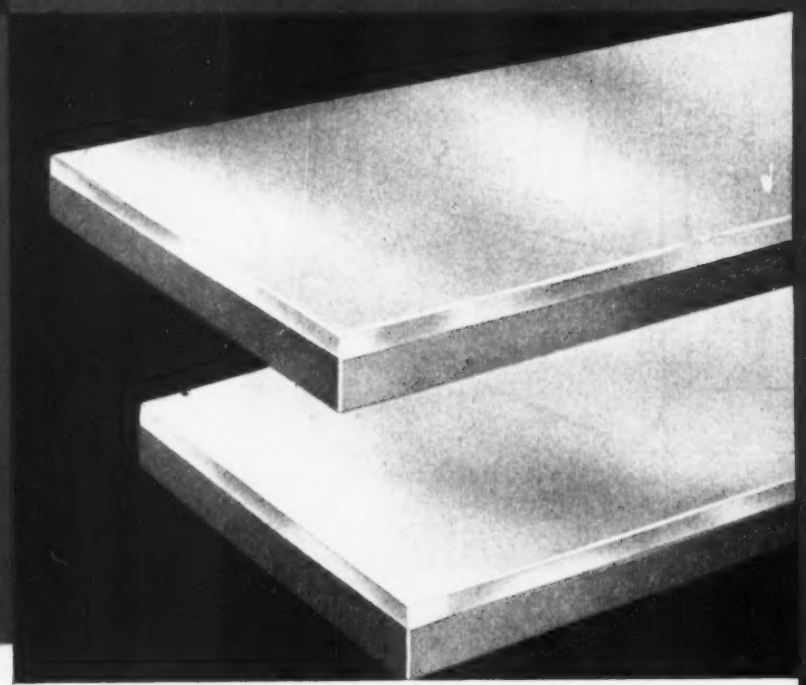

stainless steel advantages

. . . with carbon steel strength

. . . at lower cost

If you use stainless steel in your fabrication or construction, chances are you can lower your material costs substantially by means of Claymont Stainless-Clad Plates.

In numerous and diversified applications, these plates are giving all the advantages of stainless steel, including prolonged resistance to the corrosive action of acids and alkalis.

Claymont Stainless-Clad Plates are a composite of stainless steel permanently bonded to a carbon steel backing. Easy to fabricate, they will not buckle, crack or peel under the severest forming operations. To order, write or call Claymont Steel Products Department, Wickwire Spencer Steel Division, Claymont, Delaware.

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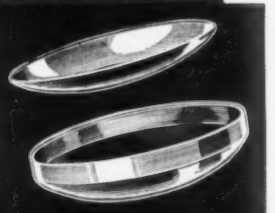
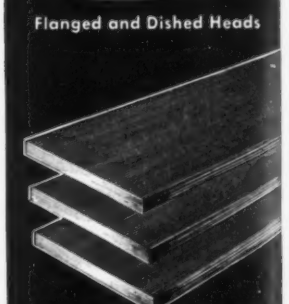
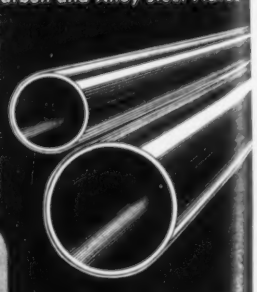


Flanged and Dished Heads



Carbon and Alloy Steel Plates



Large diameter steel pipe

CLAYMONT STEEL PRODUCTS
WICKWIRE SPENCER STEEL DIVISION
THE COLORADO FUEL AND IRON CORPORATION CF&I

1280

Expect Growing Battle Over Methods of Decontrol

Business people want controls to end completely . . . Planners hope to prolong authority on stand-by basis . . . Market continues strong . . . Ingot rate holds at 107 pct of capacity.

A battle between business people and government planners over how to end controls is already shaping up. Business people generally feel that controls should be allowed to die a natural death (next June 30), or should be ended quickly by positive action. Following the election, Washington planners have reacted sensitively; they have grudgingly given ground, but show no inclination to throw in the towel.

Instead they have developed a new line of thinking to present to the new Administration. Washington reports indicate they will argue that complete decontrol of materials is dangerous while there is a threat to world peace. Industrialists counter this by pointing out that controls have never produced a single pound of metal, and that world peace may be threatened for many years. They point out that controls authority belongs to Congress, and it can redelegate the authority if and when it is needed again.

Divergent Views—But the planners are not making their pitch for continuing controls authority on that one point. They are saying that industry and government should unite to preserve the "reporting requirements" of the Controlled Materials Plan. They contend that industrial reports on materials are of particular importance in guiding the course of national planning.

Industry contends that national planning during recent years has been going in the direction of national Socialism, and that's what they want to stop. Metalworking companies are not generally unwilling to furnish data on production and consumption of materials. A great many of them already do this through their trade associations. They do not fear collection of useful statistics, but they do fear that bureaucrats will use them in an effort to vault to a place in the sun.

Dead Letters — Assuming that DPA, NPA, and CMP are for all practical purposes headed for the scrap heap, the planners believe the U. S. Census Bureau could be enlarged to accommodate the reporting project. Sample questionnaires are already being prepared to be sent to manufacturers before the end of the year. Presumably they would be asked to report sizes, shapes and types of metals used, as well as amounts.

Steel people are continuing their series of meetings with NPA this week to map out details for orderly decontrol. Specific steps are being worked out by a task force consisting of representatives of five steel producing and six steel consuming companies. All but military uses are expected to be decontrolled early next year along the lines of a program advanced by steel companies last spring before the strike.

Ready Home—Record steel production this week continues to find a ready home among hungry steel consumers. About the only easy products are some merchant wire items and a few specialties. Most tonnage items are still in very strong demand. This is especially true of larger sizes of bars, plates and structurals. Demand for lighter material is less intense.

Both hot-rolled and cold-rolled sheets remain under urgent pressure for delivery. Big production schedules in auto and appliance industries are keeping demand at high level.

Good Business—Warehouse business is excellent—so good in fact that distributors are having a hard time replenishing inventories, despite quotas established at 120 pct of their base period. They are not greatly alarmed over the impending cutback to 100 pct of base, scheduled to begin in January, because they still expect to get close to 20 pct of total steel shipments.

Distributor inventories of steel are now thought to be about 40 pct of "normal" (Sept. 1, 1949), compared with a low of 36 pct at the end of the strike. This does not take into account the huge tonnage of steel that has been distributed through warehouses since the strike without remaining to be tabulated as inventory.

Foreign Orders—Some independent warehouses are still buying foreign steel, though the amount of this business has been declining. Most tonnage generally available on shortest delivery does not match items in shortest domestic supply.

Some in the steel industry feel that speedy action should be taken to remove remaining restrictions on construction. The industry will soon be over the hump on deliveries for industrial expansion. With deliveries for this use 80 pct completed now, the balance is expected to be cleaned up by the first quarter.

Output Holds—By that time other types of construction will be needed to take up the slack. There is plenty of pent up demand, but it is feared that restrictions will not be lifted in time for it to immediately assert itself because of time lag.

Steelmaking operations this week are scheduled at 107.0, unchanged from last week.

Life Saver for Small Fry

Another example of how Carpenter ***Application Engineering Service*** *is working for industry*

You know how youngsters are on a trip—they love to be near the window to make sure they see everything whizzing by. But that can be dangerous . . . a door can fly open, a tragedy can strike. That's why this safety door lock was invented. Quickly attached, it keeps children in . . . enables them to enjoy the trip, safe and secure. To open the door, the driver simply pulls a release knob. But the production problem wasn't as simple as that.

The material for the lock had to be economical to fabricate, had to provide high strength, corrosion resistance and a bright finish. Cold rolled steel, chrome plated, was tried but it just couldn't make the grade.

Then Carpenter was called in and **A**pplication **E**ngineering **S**ervice went to work. Results: They used Stainless No. 6 (Type 430), a bright, high-strength, easy-working Stainless produced by Carpenter for just such jobs. No. 6 met all the requirements . . . and made the lock a real sales winner.

Here is another example of how Carpenter A.E.S. is working with industry to unearth new ways to make products more functional, more salesworthy, more economical to produce. You can count on this Carpenter service to help bring these advantages to your plant, too. It goes to work as soon as you get in touch with your Carpenter Mill-Branch Warehouse or Distributor. THE CARPENTER STEEL CO., 121 W. Bern St., Reading, Pa.

Carpenter STEEL — **Tool, Alloy and Stainless Steels**

Pioneering in Improved Tool, Alloy and Stainless Steels Through Continuing Research

Market Briefs and Bulletins

Steel Still Tight—Detroit reports no easing of steel demand as yet. Defense commitments are expected to be filled by Nov. 30, but at the expense of civilian production. Unplaced fourth quarter tickets continue to turn up, often in respectable tonnages. One auto body maker was unable to find a home for 3000 tons of cold-finished bars and sheets. Another consumer with tickets was unable to place a sizable hot-rolled order. He had to wait until February.

Mill Purchase—Barium Steel Corp. has purchased a rotary forging seamless tube mill from Pittsburgh Steel Co. The mill is now being dismantled for shipment to Phoenixville, Pa., where it will soon be installed by Barium. Planned yearly production of the new mill is 180,000 tons of 5½-in. to 13⅜-in. oil well casing and heavy wall pressure tubing up to 16 in. O.D. in lengths up to 60 ft.

Private Ownership—Transfer of the former government-owned, then state-owned, magnesium plant near Las Vegas, Nev., to private ownership has been completed. New owner is Basic Management, Inc., a company composed of present occupants who operated the plant when it was still under Nevada ownership. The huge facility which cost more than $116 million is being used to produce a varied line of chemical, mineral and metal products including titanium.

No Increase—Office of Price Stabilization has rejected a request for a rate ceiling increase on contract shipments by 27 independent Great Lakes' carriers. In a letter to the Interlake Steamship Co., Cleveland, OPS explained that the firms did not qualify for an increase because their earnings were "at a very high level." OPS later qualified this stand, saying it would consider further data on the rate hike.

Less Paperwork—Steel industry may finally get some relief from the burdensome paperwork the government has piled on it. National Production Authority is working on a program to reduce the number of reports required. First step will probably be a revision of M-80. Industry is particularly anxious to get relief on reports of past due orders.

Shift Production—Chicago sheet metal fabricators are beginning to worry about the decline of home building. A few of them are diversifying their equipment in preparation for a production shift to items like light brass sheet novelties.

Freight Cars—Defense Transportation has recommended that, beginning not later than the third quarter of next year, enough steel and other materials be made available to permit production of 38,500 freight cars. This would be an increase over the present unmet goal of 33,000 cars per quarter.

Purchase Offer—Copperweld Steel Co., Pittsburgh, has offered to purchase for approximately $8,650,000 all outstanding common stock of Ohio Seamless Tube Co., Selby, Ohio. To complete purchase of the shares, Copperweld plans to raise approximately $8.5 million through a bank loan and sale of securities. Copperweld said it intends to continue the management and business of Ohio Seamless without making any substantial changes but indicated the two companies may be combined later.

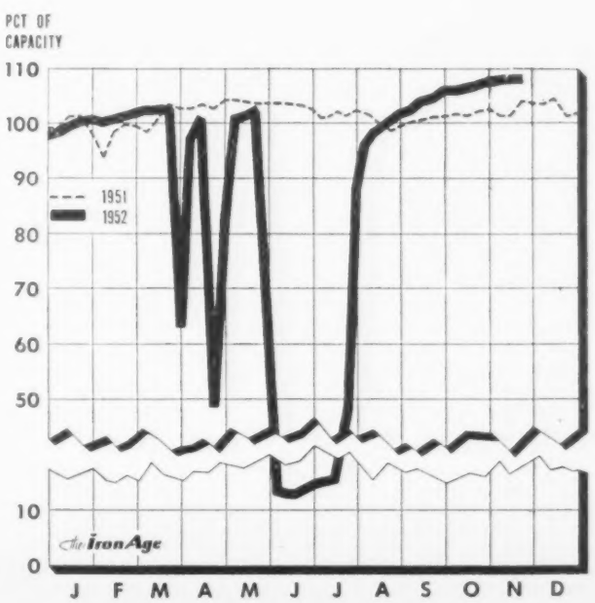
Steel Wages—Average hourly earnings for steelworkers during August were $2.139, reports American Iron & Steel Institute. This rate was 19.7¢ per hr higher than in February, 1952, the last month prior to the effective date of the new wage agreement.

STEEL OPERATIONS

District Operating Rates

District	Week of Nov. 16	Week of Nov. 9
Pittsburgh	107.0	106.0*
Chicago	113.0	111.0
Valleys	104.0	104.0*
Philadelphia	100.0	108.0
West	104.0	105.0
Buffalo	106.5	106.5
Cleveland	107.0	105.0
Detroit	106.0	106.0
Wheeling	102.0	102.0*
Birmingham (South)	106.5	107.5
South Ohio River	90.0	90.0
St. Louis	86.5	98.5
East	95.0	92.0*
Aggregate	107.0	107.0

Beginning Jan. 1, 1952, operations are based on annual capacity of 108,587,670 net tons.
* Revised



Lead Market Strong, Price Up

Undertone firm for lead, zinc . . . Lead price up to 14.50¢ at New York . . . Still ask copper price decontrol . . . Power cut brings aluminum loss to 665 tons daily—*By R. L. Hatschek.*

The lead market continued with a firm undertone last week but some of the urgency to procure the metal seemed to have evaporated. Prices were also stronger as a result of good demand and a higher price in London. Two increases during the week brought the New York price up to 14.50¢ per lb, with the London price a fraction lower.

While the zinc price has not moved upward yet, the feeling in the trade is definitely one of strength. News that British government stocks will be disposed of in a more controlled manner than lead, which was practically dumped, has been heartening. While it may have some depressing effect on prices, it certainly won't cut the bottom out of prices when zinc is freed for private trade in England about the first of the year.

Demand Higher—Zinc buying, particularly in the higher grades, has been a bit heavier in the past week. This indicates consumers' stocks were getting pretty low as they waited for prices to hit bottom. Some buying was at a flat price basis and some was on an average price basis.

Copper Hassle—Industry cries for something to be done about copper and brass pricing continue to be heard in undiminished volume. Board chairman J. J. Russell of Revere Copper & Brass, Inc., called for scrapping of copper price controls. Such action, he said, would result in a higher domestic price but not nearly the 36.50¢ per lb price for foreign metal. This resultant price had previously been estimated at 30¢ to 31¢ per lb.

A prediction was made by Herman Steinkraus, president of Bridgeport Brass Co., who foresees no immediate decontrol action but anticipates possible price freedom for the red metal within 6 months.

Want Boost — Wire and cable manufacturers are urging the government to allow higher ceilings for their products to cover increased freight rates and the expense of greater use of foreign copper. Producers also want assurance that adjustments in ceilings, made to cover the cost of using more high-priced imported copper, will not be reduced on less than 3 months' notice.

This industry reports to Office of Price Stabilization that its ratio of foreign to domestic copper is more like 43 pct to 57 pct than the government's assumed 40-60 ratio. A higher price, they said, is needed to make up the difference. They added that though various industries had received adjustments covering outbound freight costs, the wire and cable industry had not. On many products, this increase is economically important. Industry representatives will be prepared to supply data showing the effects of freight rate increases.

Aluminum Doings — Further power cuts went into effect this week affecting Northwest aluminum production. Production losses had been running about 550 tons daily, 445 tons a day in the Northwest, as a result of drought conditions. Now the loss is about 665 tons a day.

It's getting so serious that Defense Electric Power Administration even went so far as to request private users and small industrial power consumers to conserve electricity. This request for voluntary action was made 2 weeks ago and was the first such call to go out from DEPA in the current power crisis.

More Capacity—Meanwhile, the aluminum industry is rolling ahead in its expansion of non-hydropower reduction facilities. Kaiser Aluminum & Chemical Corp. started up the fourth potline at its Chalmette, La., plant a week ago. This completes the first phase of the natural gas powered facility and brings its operating capacity to 100,000 tons annually. Completion of the second 100,000-ton phase is scheduled for the first half of 1953.

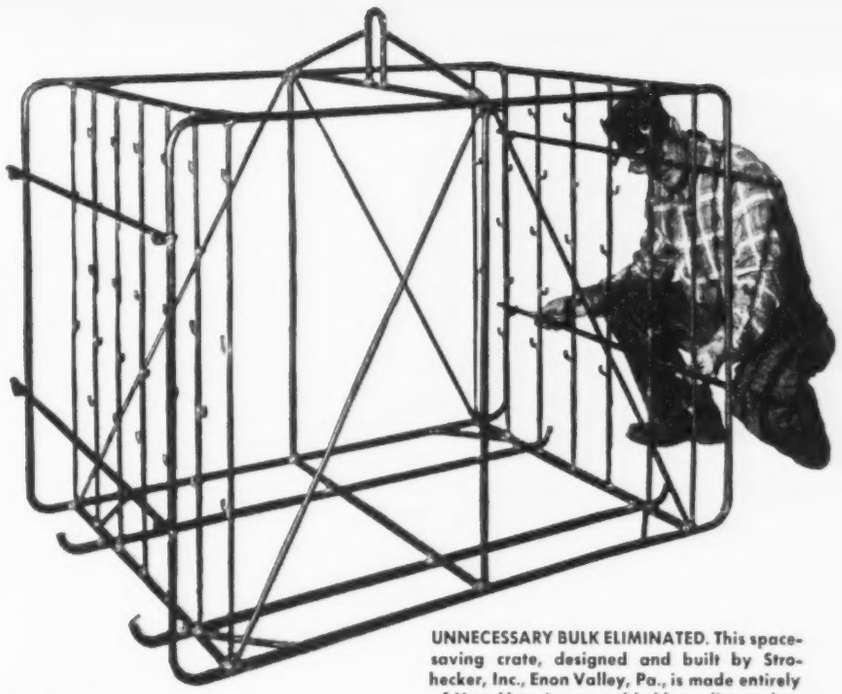
Workers recently started to bake out the pots in the first line at Aluminum Co. of America's new Rockdale, Tex., plant and metal should start flowing from this potline this week or next. Full production of the line will take a few more weeks. The other three potlines at the 85,000-ton lignite-processed smelter, will come in at intervals with the last due for initial production in April.

Initial production of new lines at Alcoa's Wenatchee operation will be delayed by lack of electric power.

NONFERROUS METAL PRICES

	Nov. 12	Nov. 13	Nov. 14	Nov. 15	Nov. 17	Nov. 18
Copper, electro, Conn.	24.50	24.50	24.50	24.50	24.50	24.50
Copper, Lake delivered	24.625	24.625	24.625	24.625	24.625	24.625
Tin, Straits, New York	$1.21¼	$1.21¼	$1.21¼	...	$1.21¼	$1.21¼*
Zinc, East St. Louis	12.50	12.50	12.50	12.50	12.50	12.50
Lead, St. Louis	14.30	14.30	14.30	14.30	14.30	14.30

Note: Quotations are going prices.
*Tentative.



UNNECESSARY BULK ELIMINATED. This space-saving crate, designed and built by Strohecker, Inc., Enon Valley, Pa., is made entirely of Monel bar. It was welded by ordinary shop methods, using "43" Monel gas welding wire, as recommended by Inco's Technical Service.

This sturdy, all-welded crate ADDS 50% TO PICKLING TANK CAPACITY

Here's a crate that carries a special message for every user of pickling equipment.

Strohecker, Inc., of Enon Valley, Pa., designed it for a customer who pickles the long, steel reflectors used behind fluorescent lights.

Of welded Monel® construction, the crate weighs only 350 pounds, and safely handles a 1,000-pound load of reflectors. It operates in a sulfuric acid solution of 5 to 10% concentration held at 180 to 200° F.

Thanks to this compact, lightweight crate, Strohecker's customer is now getting a 50% greater payload into his pickling tank—on *every* load. He's saving not only time, but labor, power and acid. And that's only natural—because he's pickling more reflectors (and less crate!) on each trip into the acid.

Check your own equipment today. There's a good chance Monel can help increase the efficiency of your pickling room, too.

For Monel is strong . . . tough . . . long-lasting. It resists hot sulfuric and other pickling acids commonly used in steel mills. It stands the bumps and jolts that fracture less ductile metals.

In addition, Monel offers *workability*. It can be fabricated by ordinary shop methods. And it can be welded—welded so perfectly that the joints have all the strength and corrosion resistance of Monel itself!

Keep Monel in mind. It makes rugged crates and racks . . . hooks and hangers . . . yokes . . . chain . . . pickle bars and accessories. Remember, though, that Monel is on extended delivery because of defense needs. It will pay you to order in advance, and to include NPA rating and complete end-use information.

The booklet, "Where Monel Pays its Way in Pickling," has been specially prepared to show you how useful Monel can be. Write us for your copy—now.

INCO TRADE MARK

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

Monel PICKLING EQUIPMENT — extra life, extra capacity, extra safety

Nonferrous Prices

MILL PRODUCTS

(Cents per lb, unless otherwise noted)

Aluminum

(Base 30,000 lb, f.o.b. shp. pt. frt. allowed)

Flat Sheet: 0.188 in., 2S, 3S, 31.6¢; 4S, 61S-O, 33.6¢; 52S, 35.8¢; 24S-O, 24S-OAL, 34.5¢; 75S-O, 75S-OAL, 41.9¢; 0.081 in., 2S, 3S, 32.8¢; 4S, 61S-O, 35.2¢; 52S, 37.4¢; 24S-O, 24S-OAL, 35.8¢; 75S-O, 75S-OAL, 43.9¢; 0.032 in., 2S, 3S, 34.5¢; 4S, 61S-O, 39.0¢; 52S, 41.8¢; 24S-O, 24S-OAL, 43.8¢; 75S-O, 75S-OAL, 54.8¢.

Plate ¼ in. and Heavier: 2S-F, 3S-F, 29.7¢; 4S-F, 31.7¢; 53S-F, 33.4¢; 61S-O, 32.3¢; 24S-O, 24S-OAL, 34.0¢; 75S-O, 75S-OAL, 40.7¢.

Extruded Solid Shapes: Shape factors 1 to 5, 35.5¢ to 77.2¢; 12 to 14, 36.2¢ to 93.5¢; 24 to 26, 38.7¢ to $1.22; 36 to 38, 45.9¢ to $1.79.

Rod, Rolled: 1.064 to 4.5 in., 2S-F, 3S-F, 39.4¢ to 35.2¢; cold-finished, 0.375 to 3 in., 2S-F, 3S-F, 42.5¢ to 36.8¢.

Screw Machine Stock: Rounds, 11S-Ts, ⅛ to 11/32 in., 56.2¢ to 44.1¢; ⅜ to 1½ in., 43.6¢ to 41.0¢; 1 9/16 to 3 in., 40.4¢ to 37.8¢; 17S-Ts, 1.6¢ per lb lower. Base 5000 lb.

Drawn Wire: Coiled, 0.051 to 0.374 in., 2S, 41.5¢ to 30.5¢; 52S, 50.4¢ to 36.8¢; 56S, 53.6¢ to 44.1¢; 17S-T4, 56.7¢ to 39.4¢; 61S-T4, 50.9¢ to 38.9¢.

Extruded Tubing: Rounds, 63S-T5, OD in in.: 1¼ to 2, 38.9¢ to 56.7¢; 2 to 4, 35.2¢ to 47.8¢; 4 to 6, 35.7¢ to 43.6¢; 6 to 9, 36.2¢ to 45.7¢.

Roofing Sheet: Flat, 0.019 in. x 28 in., per sheet, 72 in., $1.199; 96 in., $1.598; 120 in., $1.997; 144 in., $2.398. 0.24 in. x 28 in., 72 in., $1.448; 96 in., $1.931; 120 in., $2.414; 144 in., $2.897. Coiled sheet: 0.019 in. x 28 in., 29.6¢ per lb, 0.024 in. x 28 in., 28.2¢ per lb.

Magnesium

(F.O.B. mill, freight allowed)

Sheet and Plate: FS1-O, ¼ in., 63¢; 3/16 in., 65¢; ⅛ in., 67¢; B & S Gage 10, 68¢; 12, 72¢. Specification grade higher. Base: 30,000 lb.

Extruded Round Rod: M, diam in., ¼ to 0.311 in., 74¢; ½ to ¾ in., 57.5¢; 1¼ to 1.749 in., 53¢; 2½ to 5 in., 48.5¢. Other alloys higher. Base up to ¾ in. diam, 10,000 lb; ¾ to 2 in., 20,000 lb; 2 in. and larger, 30,000 lb.

Extruded Solid Shapes, Rectangles: M. In weight per ft, for perimeters less than size indicated, 0.10 to 0.11 lb, 3.5 in., 62.3¢; 0.22 to 0.25 lb, 5.9 in., 59.3¢; 0.50 to 0.59 lb, 8.6 in., 56.7¢; 1.8 to 2.59 lb, 19.5 in., 53.8¢; 4 to 6 lb, 28 in., 49¢. Other alloys higher. Base, in weight per ft of shape: Up to ½ lb, 10,000 lb; ½ to 1.80 lb, 20,000 lb; 1.80 and heavier, 30,000 lb.

Extruded Round Tubing: M, wall thickness, outside diam, in., 0.049 to 0.057; ¼ in. to 5/16, $1.40; 5/16 to ⅜, $1.26; ½ to ⅝, 93¢; 1 to 2 in., 76¢; 0.165 to 0.219, ⅝ to ¾, 61¢; 1 to 2 in., 57¢; 3 to 4 in., 56¢. Other alloys higher. Base, OD in in.: Up to 1½ in., 10,000 lb; 1½ in. to 3 in., 20,000 lb; 3 in. and larger, 30,000.

Titanium

(100,000 lb base, f.o.b. mill)

Commercially pure and alloy grades: Sheets and strip, HR or CR, $15; Plate, HR, $12; Wire, rolled and/or drawn, $10; Bar, HR or forged, $6; Forgings, $6.

Nickel and Monel

(Base prices, f.o.b. mill)

	"A" Nickel	Monel
Sheets, cold-rolled	77	60½
Strip, cold-rolled	83	63½
Rods and bars	78	58½
Angles, hot-rolled	78	58½
Plates	78	59½
Seamless tubes	106	93½
Shot and blocks		53½

Copper, Brass, Bronze

(Freight prepaid on 200 lb)

	Sheet	Rods	Extruded Shapes
Copper	45.52		45.12
Copper, h-r		41.37	
Copper, drawn		42.62	
Low brass	42.34	42.02	
Yellow brass	40.17	39.86	
Red brass	43.10	42.79	
Naval brass	44.72	38.78	40.64
Leaded brass			38.02
Com'l bronze	44.39	44.08	
Mang. bronze	48.44	42.83	43.89
Phos. bronze	64.72	64.97	
Muntz metal	42.69	38.25	39.50
Ni silver, 10 pct	51.96	54.18	

PRIMARY METALS

(Cents per lb, unless otherwise noted)

Aluminum ingot, 99+%, 10,000 lb, freight allowed	20.00
Aluminum pig	19.00
Antimony, American, Laredo, Tex.	34.50
Beryllium copper, 3.75-4.25% Be	$1.56
Beryllium aluminum 5% Be, Dollars per lb contained Be	$69.50
Bismuth, ton lots	$2.25
Cadmium, del'd	$2.00
Cobalt, 97-99% (per lb)	$2.40 to $2.47
Copper, electro, Conn. Valley	24.50
Copper, Lake, delivered	24.625
Gold, U. S. Treas., dollars per oz.	$35.00
Indium, 99.8%, dollars per troy oz.	$2.25
Iridium, dollars per troy oz.	$2.00
Lead, St. Louis	14.30
Lead, New York	14.50
Magnesium, 99.8+%, f.o.b. Freeport, Tex., 10,000 lb.	24.50
Magnesium, sticks, 100 to 500 lb.	42.00 to 44.00
Mercury, dollars per 76-lb. flask, f.o.b. New York	$200 to $203
Nickel electro, f.o.b. N. Y. warehouse	59.58
Nickel oxide sinter, at Copper Creek, Ont., contained nickel	52.75
Palladium, dollars per troy oz.	$24.00
Platinum, dollars per troy oz.	$90 to $93
Silver, New York, cents per oz.	83.25
Tin, New York	$1.21¼
Titanium, sponge	$5.00
Zinc, East St. Louis	12.50
Zinc, New York	13.33
Zirconium copper, 50 pct	$6.20

REMELTED METALS

Brass Ingot

(Cents per lb, delivered carloads)

85-5-5-5 ingot	
No. 115	27.25
No. 120	26.75
No. 123	26.25
80-10-10 ingot	
No. 305	33.00
No. 315	30.50
88-10-2 ingot	
No. 210	41.50
No. 215	40.00
No. 245	34.50
Yellow ingot	
No. 405	23.25
Manganese bronze	
No. 421	30.50

Aluminum Ingot

(Cents per lb, 100,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper, max.	20.6
0.60 copper, max.	20.4
Piston alloys (No. 122 type)	20.5
No. 12 alum. (No. 2 grade)	19.5
108 alloy	20.6
195 alloy	20.8
13 alloy (0.60 copper max.)	20.8
ASN-679	20.5

Steel deoxidizing aluminum, notch-bar granulated or shot

Grade 1—95-97½%	18.80
Grade 2—92-95%	18.60
Grade 3—90-92%	18.40
Grade 4—85-90%	18.20

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, freight allowed, 500 lb lots)

Copper	
Cast, oval, 15 in. or longer	37.34
Electrodeposited	33¾
Flat rolled	38.34
Forged ball anodes	43
Brass, 80-20	
Cast, oval, 15 in. or longer	34¾
Zinc, oval	26½
Ball, anodes	25½
Nickel, 99 pct plus	
Cast	76.00
Rolled, depolarized	77.00
Cadmium	$2.15
Silver 999 fine, rolled, 100 oz lots, per troy oz, f.o.b. Bridgeport, Conn	97½

Chemicals

(Cents per lb, f.o.b. shipping points)

Copper cyanide, 100 lb drum	63
Copper sulfate, 99.5 crystals, bbl.	12.85
Nickel salts, single or double, 4-100 lb bags, frt. allowed	27½
Nickel chloride, 375 lb drum	27½
Silver cyanide, 100 oz lots, per oz	67¼
Sodium cyanide, 96 pct domestic 200 lb drums	19.25
Zinc cyanide, 100 lb drum	47.7

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add ½¢ per lb for shipments of 20,000 to 40,000 lb; add 1¢ for more than 40,000 lb)

	Heavy	Turnings
Copper	21½	20¾
Yellow brass	19⅞	17⅞
Red brass	20¼	19⅜
Comm. bronze	20½	19¾
Mang. bronze	18½	17¾
Brass rod ends	18⅞	

Custom Smelters' Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
Refinery brass	17.25*
Radiators	14.75

* Dry copper content.

Ingot Makers' Scrap

(Cents per pound, carload lots, delivered to refinery)

No. 1 copper wire	19.25
No. 2 copper wire	17.75
Light copper	16.50
No. 1 composition	18.50
No. 1 comp. turnings	18.25
Rolled brass	15.50
Brass pipe	16.50
Radiators	14.75

Aluminum

Mixed old cast	9 — 9¾
Mixed new clips	10 —11
Mixed turnings, dry	9 — 9½
Pots and pans	8½— 9

Dealers' Scrap

(Dealers' buying price, f.o.b. New York in cents per pound)

Copper and Brass

No. 1 heavy copper and wire	18¾—19¼
No. 2 heavy copper and wire	17 —17½
Light copper	15½—16
New type shell cuttings	15½—16
Auto radiators (unsweated)	14
No. 1 composition	17½—18
No. 1 composition turnings	17 —17½
Unlined red car boxes	16½—17
Cocks and faucets	15 —15½
Mixed heavy yellow brass	14½—15
Old rolled brass	14½—15
Brass pipe	15½—16
New soft brass clippings	16 —16½
Brass rod ends	15½—16
No. 1 brass rod turnings	15 —15½

Aluminum

Alum. pistons and struts	6½— 7
Aluminum crankcases	7½
2S aluminum clippings	10½
Old sheet and utensils	7¼
Borings and turnings	5 — 6
Misc. cast aluminum	7½— 8
Dural clips (24S)	7½

Zinc

New zinc clippings	7 — 7½
Old zinc	5 — 5½
Zinc routings	3 — 3¼
Old die cast scrap	4 — 4½

Nickel and Monel

Pure nickel clippings	35 —36
Clean nickel turnings	35 —36
Nickel anodes	35 —36
Nickel rod ends	35 —36
New Monel clippings	28 —29
Clean Monel turnings	20 —21
Old sheet Monel	28 —29
Nickel silver clippings, mixed	13 —14
Nickel silver turnings, mixed	12 —13

Lead

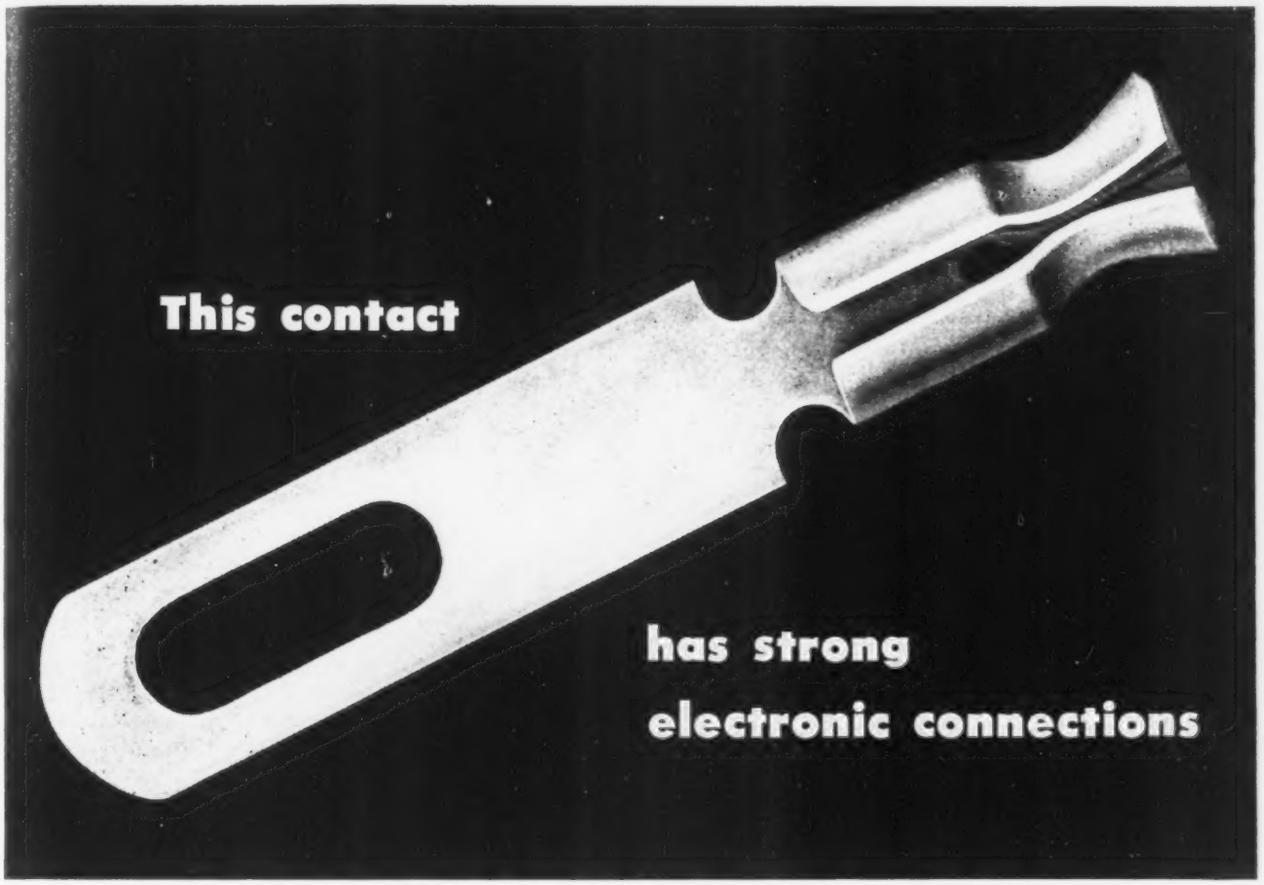
Soft scrap, lead	11¼—11⅝
Battery plates (dry)	6¼— 6½
Batteries, acid free	4½

Magnesium

Segregated solids	15 —16
Castings	14 —15

Miscellaneous

Block tin	100
No. 1 pewter	70
No. 1 auto babbitt	55 —60
Mixed common babbitt	13½—14
Solder joints	18 —18½
Siphon tops	60
Small foundry type	18½—19
Monotype	14 —14½
Lino. and stereotype	13 —13½
Electrotype	11¼—11½
Hand picked type shells	9¼— 9½
Lino. and stereo. dross	5½
Electro dross	5



IT'S MADE OF BERYLCO BERYLLIUM COPPER

The safety of a plane, the effectiveness of a battalion, or the success of a bombing mission may depend on this tiny beryllium copper part, which measures only 5/16 inch in length— one-twelfth the size shown here.

Contacts like this are used in miniature tube sockets for radar, communications and other electronics equipment. Every day thousands of these contacts are stamped out at high speeds on progressive dies.*

The men who design our military equipment are well aware of the old saying "For want of a nail, the shoe was lost" . . . and consequently the battle. The specifications, the load and test requirements, are exacting. Contacts must excel in spring properties, in resistance to both corrosion and relaxation, in electrical conductivity. They must not be subject to vibrational fatigue and must withstand wide variations in temperature. There is one metal which possesses all these essential characteristics to a high degree— Berylco beryllium copper.

Unique properties, such as combination of great strength and electrical conductivity, make this versatile alloy as important in the manufacture of peacetime products as of those for defense. We invite you to take advantage, in your plans for the future, of the technical knowledge acquired by the world's largest producer of beryllium copper. Write or telephone any of the offices listed below.

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Sample material available for testing purposes

*Data supplied by John Volkert Metal Stampings, Inc., Queens Village, L. I., N. Y.

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Inventory—Gage of Market Potential

Iron Age editors survey stockpiles as signpost to market potential . . . Stockpiles are comfortable in most districts . . . Larger producers stock the largest scrap piles.

The source of strength or weakness for the scrap iron and steel market is the steelmaking rate and the condition of steel mill scrap piles.

To give the scrap industry a signpost of market potential as influenced by inventory, IRON AGE editors have compiled stockpile statistics for the major steelmaking centers.

In Pittsburgh scrap inventories average about 70 days. The major steel producer in the area has a company-wide average of 66 days. Smaller producers are holding less inventory—but it must be remembered their needs are much smaller and if a shortage arises allocations protect them. Taller scrap piles also mean more money tied up.

One large producer in the Pittsburgh district has 90 days inventory. Another has 30 days which is deemed fully adequate. Average of the Wheeling area runs about 50 days.

Described as comfortable Chicago inventories average about 60 days—not the rule with some smaller mills content with stockpiles as low as 3 weeks.

On the West Coast stockpiles are reported glutted, ranging up to 90 days. Detroit inventory runs from a desperate 5 days at one electric furnace mill to 30 days and less. Nevertheless, the 30-day stockpiles are viewed as perfectly adequate. One captive steel plant probably has about 45 days.

Tending to offset the bulky stockpiles in the hands of consumers are dealer inventories that are often scanty.

The steelmaking rate will enter 1953 galloping at capacity. It is expected that a more normal situation steelmaking may follow when supply aligns itself with demand. This may mean a slip in the operating rate not drastic enough to cause discomfort for most.

Pittsburgh—Scrap is moving freely in this district. Consumers report material is coming out in good volume, and quality is excellent. Indications are that mills will buy conservatively for the balance of the year. One steel producer who had expected to be building up inventory this month and next reports he has been able to fulfill his objective and will coast along until 1953.

Chicago—Scrap began to show slowing in steelmaking grades—at least at the dealer level. Openhearth grades have been moving well. But even here a little pessimism was evident. Scrap collection is not heavy and dealer stocks edge downward. Blast furnace and electric furnace grades were very slow. Downgrading in electric furnace grades was reported.

Philadelphia—The market here is generally moving along at a slow, steady pace with the exception of the cast grades. Early this week there were few if any outstanding orders for cast and trade talk was that the next orders would be at lower prices. Consumers are not too fussy on openhearth steel but electric furnace must be good or it bounces.

New York—Some brokers see some uncertainty in the purchasing policies of steel mill consumers. However the market here continues at the same pace, fairly firm but not lively. Inspectors insist that Grades 16, 17, and 18 must be of good quality. Cast is still dead and will remain so pending a genuine revival of foundry business.

Detroit — A critical shortage of electric furnace grades sent the president of one mill to Washington last week in an attempt to get some directed toward his sagging inventory. Market for openhearth grades is also strong. Pittsburgh purchases of blast furnace grades took some of the softness out of borings and turnings. Only Ford is in a genuinely comfortable inventory situation.

St. Louis — Scrap shipments have picked up moderately. Railroad lists are expected to increase. Because the trade is lagging on fulfillment of contracts, steel mills are postponing making further commitments.

Cleveland—Mills here are in a comfortable position and shipments are being regulated closely. Out-of-district blast furnace scrap has been counterbalanced by local and nearby consumers. Dealer blast is still on a selective basis with emphasis on quality.

Birmingham—Movement of scrap is slow, although some heavy melting is going north on barges from Decatur and Huntsville. One southern mill is still buying, but the largest buyer has been out of the market for more than a month. Dealers report some farm scrap coming in but not in large quantities.

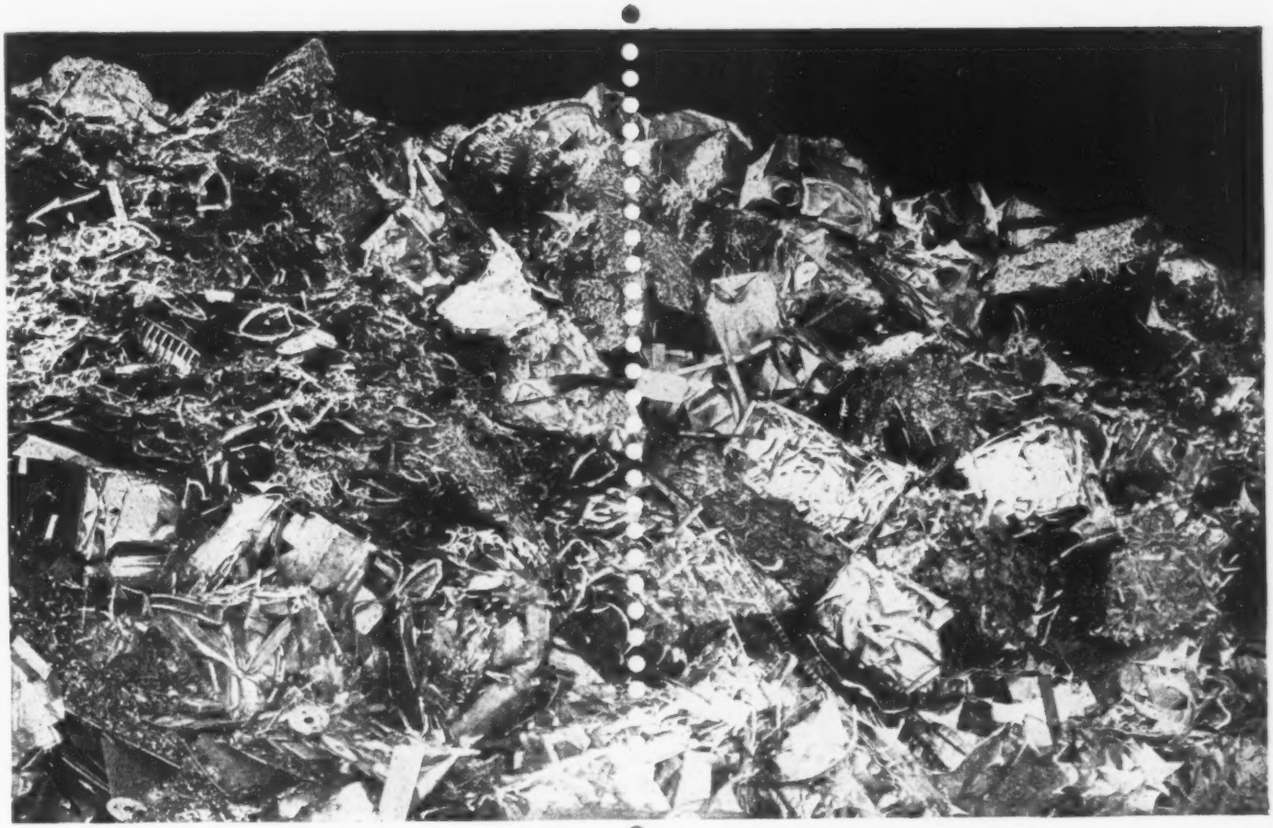
Cincinnati—There is still no great pressure to buy scrap as the market remains steady but dull. Freight car shortage has eased somewhat. Electric furnace scrap supply is also slightly better.

Boston—Cast prices dropped further in a dull market. Mixed cupola cast is off $1 to $2 to $37 per gross ton and unstripped motor blocks are down to a range of $30 to $30.25. Steel grades remain firm with good movement and no complaints from the trade.

Buffalo—The fact that the second largest consumer here has now extended into the 8th week an embargo on dealers' shipments of scrap reflects healthy position of mills' reserve stock piles. Aided by good weather large supplies are moving to other consumers. Shipments outside the area are also heavy.

West Coast—Influx of Australian pig iron into Los Angeles last week, reportedly a full cargo, depressed the market for cast scrap down to $46. The Australian pig continues to sell for $60 ton or $4 under going domestic price. Steelmaking scrap market was weak as mills continued working on inventory.

specialists
in stainless scrap



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Iron and Steel SCRAP PRICES (Maximum basing point prices, per gross ton, as set by OPS in CPR 5 and amendments.)

Switching Charge (Dollars per gross ton) →		$0.99 .75 .53 .65 .75 .51 .75		.75 .51 .51 .75 .70	.76 .83 .65 .26	1.34 .79 .50 .20 .51 .51	.20 .52 .47 .51 .51	.51	.95	.50	.78	.50 .43 .51	.33	.57	.66 .65 .52 .66 .59
Basing Points →		Pittsburgh Johnstown Brackenridge Butler Midland Monessen Sharon		Youngstown Canton Steubenville Warren Weirton	Cleveland Buffalo Cincinnati Middletown	Chicago Claymont Coatesville Conshohocken Harrisburg Phoenixville	Sparrows Pt. Bethlehem Ashland, Ky. Kokomo, Ind. Portsmouth, O.	St. Louis	Detroit	Duluth	Kansas City	Birmingham Alabama City Atlanta	Minnequa	Houston	Los Angeles Pittsburg, Cal. Portland, Ore. San Francisco Seattle
GRADES	OPS No.														
No. 1 bundles	1	$44.00		$44.00	$43.00	$42.50	$42.00	$41.00	$41.15	$40.00	$39.50	$39.00	$38.00	$37.00	$35.00
No. 1 busheling	2	44.00		44.00	43.00	42.50	42.00	41.00	41.15	40.00	39.50	39.00	38.00	37.00	35.00
No. 1 heavy melting	3	43.00		43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.00	36.00	34.00
No. 2 heavy melting	4	43.00		43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.00	36.00	34.00
No. 2 bundles	5	43.00		43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.00	36.00	34.00
Machine shop turnings	6	34.00		34.00	33.00	32.50	32.00	31.00	31.15	30.00	29.50	29.00	28.00	27.00	25.00
Mixed borings and turnings	7	38.00		38.00	37.00	36.50	36.00	35.00	35.15	34.00	33.50	33.00	32.00	31.00	29.00
Shoveling turnings	8	38.00		38.00	37.00	36.50	36.00	35.00	35.15	34.00	33.50	33.00	32.00	31.00	29.00
Cast iron borings	10	38.00		38.00	37.00	36.50	36.00	35.00	35.15	34.00	33.50	33.00	32.00	31.00	29.00
No. 1 chemical borings	26	41.00		41.00	40.00	39.50	39.00	38.00	38.15	37.00	36.50	36.00	35.00	34.00	32.00
Forge crops	11	51.50		51.50	50.50	50.00	49.50	48.50	48.65	47.50	47.00	48.50	45.50	44.50	42.50
Bar Crops and plate	12	49.00		49.00	48.00	47.50	47.00	46.00	46.15	45.00	44.50	44.00	43.00	42.00	40.00
Punchings and plate	14	46.50		46.50	45.50	45.00	44.50	43.50	43.65	42.50	42.00	41.50	40.50	39.50	37.50
Electric furnace bundles	15	46.00		46.00	45.00	44.50	44.00	43.00	43.15	42.00	41.50	41.00	40.00	39.00	37.00
Cut struc., plate, 3 ft and less	16	47.00		47.00	46.00	45.50	45.00	44.00	44.15	43.00	42.50	42.00	41.00	40.00	38.00
Cut struc., plate, 2 ft and less	17	49.08		49.00	48.00	47.50	47.00	46.00	46.15	45.00	44.50	44.00	43.00	42.00	40.00
Cut. struc., 1 ft and less	18	50.00		50.00	49.00	48.50	48.00	47.00	47.15	46.00	45.50	45.00	44.00	43.00	41.00
Foundry steel, 2 ft and less	20	44.00		44.00	43.00	42.50	42.00	41.00	41.15	40.00	39.50	39.00	38.00	37.00	35.00
Foundry steel, 1 ft and less	21	46.00		46.00	45.00	44.50	44.00	43.00	43.15	42.00	41.50	41.00	40.00	39.00	37.00
Heavy trimmings	24	43.00		43.00	42.00	41.50	41.00	40.00	40.15	39.00	38.50	38.00	37.00	36.00	34.00
No. 1 RR heavy melting	RR 1	46.00		46.00	45.00	44.50	44.00	43.00	43.15	42.00	41.50	41.00	40.00	39.00	37.00
Scrap rails, random lengths	RR 14	48.00		48.00	47.00	46.50	46.00	45.00	45.15	44.00	43.50	43.00	42.00	41.00	39.00
Scrap rails, 3 ft and less	RR 16	51.00		51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00
Scrap rails, 2 ft and less	RR 17	52.00		52.00	51.00	50.50	50.00	49.00	49.15	48.00	47.50	47.00	46.00	45.00	43.00
Scrap rails, 18 in. and less	RR 18	54.00		54.00	56.00	52.50	52.00	51.00	51.15	50.00	49.50	49.00	48.00	47.00	45.00
Rerolling rails	RR 15	53.00		53.00	52.00	51.50	51.00	50.00	50.15	49.00	48.50	48.00	47.00	46.00	44.00
Uncut tires	RR 20	48.00		48.00	47.00	46.50	46.00	45.00	45.15	44.00	43.50	43.00	42.00	41.00	39.00
Cut tires	RR 21	51.00		51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00
Cut bolsters and side frames	RR 23	49.00		49.00	48.00	47.50	47.00	46.00	46.15	45.00	44.50	44.00	43.00	42.00	40.00
RR specialties	RR 24, 28, 29	51.00		51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00
Solid steel axles	RR 25	58.00		58.00	57.00	56.50	56.00	55.00	55.15	54.00	53.50	53.00	52.00	51.00	49.00
No. 3 steel wheels	RR 27	51.00		51.00	50.00	49.50	49.00	48.00	48.15	47.00	46.50	46.00	45.00	44.00	42.00
Unassorted	RR 35	40.08		40.00	39.00	38.50	38.00	37.00	37.15	36.00	35.50	35.00	34.00	33.00	31.00

Cast Scrap Ceilings

Prices set by CPR 5, OPS

(F.o.b. all shipping points)

Grades	OPS No.	
Cupola cast	1	$49.00
Charging box cast	2	47.00
Heavy breakable cast	3	45.00
Cast iron brake shoes	5	41.00
Stove plate	6	46.00
Clean auto cast	7	52.00
Unstripped motor blocks	8	43.00
Cast iron carwheels	9	47.00
Malleable	10	55.00
Drop broken mach'y cast	11	52.00

Ceiling price of clean cast iron foundry cupola drops is 75 pct of corresponding grade.

Under Ceiling Scrap Prices

Pittsburgh

Machine shop turnings	$32.00
No. 1 machinery cast	52.00
Heavy breakable cast	45.00
Malleable	55.00

Chicago

Low phos. forge crops	$50.00 to $51.00
Cut struc., plate, 3 ft & less	44.50 to 45.50
Cut struc., plate, 2 ft & less	46.50 to 47.50
Cut struc., plate, 1 ft & less	47.50 to 48.50
Machine shop turnings	30.00 to 31.50
Mixed borings, turnings	34.00 to 35.50
Shoveling turnings	34.00 to 35.50
Cast iron borings	34.00 to 35.50
Cupola cast	43.00 to 44.00
Heavy breakable cast	40.00 to 41.00
Malleable	48.00 to 49.00
Stove plate	41.00 to 42.00
Clean auto cast	46.00 to 48.00
Charging box cast	41.00 to 42.00
Drop broken mach'y	46.50 to 48.00
Unstripped motor blocks	36.00 to 37.00
Cast iron brake shoes	40.00 to 41.00

Philadelphia Area

Clean cast chem. borings	$36.50 to $37.00
Cupola cast	47.00 to 48.00
Unstripped motor blocks	34.00 to 36.00
Charging box cast	45.00 to 46.00

Cleveland

Cast iron borings	$34.00 to $34.50
Stove plate	45.00 to 46.00
Malleable	54.00 to 55.00

Youngstown

Cast iron borings	$35.00 to $35.50

Buffalo

No. 1 machinery cast	$49.00 to $50.00
No. 1 cupola cast	46.00 to 47.00

Birmingham

Shoveling turnings	$30.00 to $32.00
Cast iron borings	30.00 to 32.00
No. 1 Cupola cast	46.00 to 47.00
Stove plate	41.50 to 42.50
Charging box cast	36.00 to 38.00
Heavy breakable	36.00 to 38.00
Unstripped motor blocks	39.00 to 40.00

New York

Brokers' Buying prices per gross ton, on cars:

Clean cast chem. borings	$30.00 to $30.50
No. 1 machinery cast	47.00 to 49.00
Mixed yard cast	43.00
Charging box cast	43.00 to 44.00
Heavy breakable cast	44.00 to 45.00
Unstripped motor blocks	34.00 to 35.00

Boston

Brokers' Buying prices per gross ton, on cars:

Mixed cupola cast	$37.00
Heavy breakable cast	$39.00 to 40.00
Stove plate	36.00 to 37.00
Unstripped motor blocks	30.00 to 30.25

Detroit

Brokers' Buying prices per gross ton, on cars:

No. 1 cupola cast	$48.00
Heavy breakable cast	43.00 to 44.00
Stove plate	43.00 to 44.00
Cast iron brake shoes	39.00 to 40.00

Cincinnati

No. 1 cupola cast	$49.00
Stove plate	46.00
Drop broken cast	$51.00 to 52.00

St. Louis

Charging box cast	$43.00 to $44.00
No. 1 cupola cast	43.00
Heavy breakable cast	41.00 to 42.00
Unstripped motor blocks	38.00

San Francisco

No. 2 heavy melting	$31.00
No. 2 bundles	29.00
Machine shop turnings	14.00
No. 1 cupola cast	44.00

Los Angeles

No. 2 heavy melting	$31.00
No. 2 bundles	29.00
Machine shop turnings	14.00
Shoveling turnings	20.00
No. 1 cupola cast	46.00

Seattle

No. 2 bundles	$29.00
No. 1 cupola cast	43.00
Heavy breakable	35.50

Hamilton, Ont.

No. 1 hvy. melting	$35.50
No. 1 bundles	35.50
No. 2 bundles	35.00
Mechanical bundles	33.50
Mixed steel scrap	31.50
Mixed borings, turnings	32.50
Rails, remelting	35.50
Rails, rerolling	44.80
Bushelings	30.50
Bush, new fact, prep'd	33.50
Bush, new fact, unprep'd	32.50
Short steel turnings	32.50
Cast scrap	50.00

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SEATTLE, WASH.

LEADERS IN IRON AND STEEL SCRAP SINCE 1889

Comparison of Prices

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price advances over previous week are printed in Heavy Type; declines appear in *Italics*.

	Nov. 18 1952	Nov. 11 1952	Oct. 21 1952	Nov. 20 1951
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	3.775¢	3.775¢	3.775¢	3.60¢
Cold-rolled sheets	4.575	4.575	4.575	4.35
Galvanized sheets (10 ga)	5.075	5.075	5.075	4.80
Hot-rolled strip	3.725	3.725	3.725	3.50
Cold-rolled strip	5.20	5.20	5.20	4.75
Plate	3.90	3.90	3.90	3.70
Plates wrought iron	9.00	9.00	9.00	7.85
Strains C-R strip (No. 302)	36.75†	36.75†	36.75†	36.75
Tin and Terneplate: (per base box)				
Tinplate (1.50 lb.) cokes	$8.95	$8.95	$8.95	$8.70
Tinplate, electro (0.50 lb.)	7.65	7.65	7.65	7.40
Special coated mfg. ternes	7.75	7.75	7.75	7.50
Bars and shapes: (per pound)				
Merchant bars	3.95¢	3.95¢	3.95¢	3.70¢
Cold finished bars	4.925	4.925	4.925	4.55
Alloy bars	4.675	4.675	4.675	4.30
Structural shapes	3.85	3.85	3.85	3.65
Stainless bars (No. 302)	31.50†	31.50†	31.50†	31.50
Wrought iron bars	10.05	10.05	10.05	9.50
Wire: (per pound)				
Bright wire	5.225¢	5.225¢	5.225¢	4.85¢
Rails: (per 100 lb)				
Heavy rails	$3.775	$3.775	$3.775	$3.60
Light rails	4.25	4.25	4.25	4.00
Semifinished Steel: (per net ton)				
Rerolling billets	$59.00	$59.00	$59.00	$56.00
Slabs, rerolling	59.00	59.00	59.00	56.00
Forging billets	70.50	70.50	70.50	66.00
Alloy blooms, billets, slabs	76.00	76.00	76.00	70.00
Wire Rod and Skelp: (per pound)				
Wire rods	4.325¢	4.325¢	4.325¢	4.10¢
Skelp	3.55	3.55	3.55	3.35

† Add 4.7 pct. to base and extras.

Composite: (per pound)				
Finished steel base price	4.376¢	4.376¢	4.376¢	4.131¢
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$60.69	$60.69	$60.69	$57.97
Foundry, Valley	55.00	55.00	55.00	52.50
Foundry, Southern, Cin'ti	58.93	58.93	58.93	55.58
Foundry, Birmingham	51.38	51.38	51.38	48.88
Foundry, Chicago†	55.00	55.00	55.00	52.50
Basic del'd Philadelphia	59.77	59.77	59.77	57.09
Basic, Valley furnace	54.50	54.50	54.50	52.00
Malleable, Chicago†	55.00	55.00	55.00	52.50
Malleable, Valley	55.00	55.00	55.00	52.50
Ferromanganese	226.25	226.25	226.25	186.25

†The switching charges for delivery to foundries in the Chicago district is $1 per ton.

‡Average of U. S. prices quoted on Ferroalloy pages.

Composite: (per gross ton)				
Pig iron	$55.26	$55.26	$55.26	$52.72
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$43.00*	$43.00*	$43.00*	$43.00*
No. 1 steel, Phila. area	41.50*	41.50*	41.50*	41.50*
No. 1 steel, Chicago	41.50*	41.50*	41.50*	41.50*
No. 1 bundles, Detroit	41.15*	41.15*	41.15*	41.15*
Low phos., Youngstown	46.50*	46.50*	46.50*	46.50*
No. 1 cast, Pittsburgh	49.00†	49.00†	49.00†	49.00†
No. 1 cast, Philadelphia	47.50	47.50	47.50	49.00†
No. 1 cast, Chicago	*43.50*	44.50	44.50	49.00†

* Basing pt., less broker's fee. † Shipping pt., less broker's fee.

Composite: (per gross ton)				
No. 1 heavy melting scrap	$42.00	$42.00	$42.00	$42.00
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75	$14.75	$14.75	$14.75
Foundry coke, prompt	17.75	17.75	17.75	17.75
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	24.50	24.50	24.50	24.50
Copper, Lake, Conn.	24.625	24.625	24.625	24.625
Tin, Straits, New York	81.21¼†	81.21¼	81.21¼	81.03
Zinc, East St. Louis	12.50	12.50	13.50	19.50
Lead, St. Louis	14.30	14.00	13.80	18.80
Aluminum virgin ingot	20.00	20.00	20.00	19.00
Nickel, electrolytic	59.58	59.58	59.58	59.58
Magnesium, ingot	24.50	24.50	24.50	24.50
Antimony, Laredo, Tex.	34.50	34.50	39.00	50.00

† Tentative.

Composite Price Notes

Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold-rolled sheets and strips, representing major portion of finished steel shipment. Index recapitulated in Aug. 28, 1941, issue and in May 12, 1949.

Starting with the issue of May 12, 1949, the weighted finished steel composite was revised for the years 1941 to date. The weights used are based on the average product shipments for the 7 years 1937 to 1940 inclusive and 1946 to 1948 inclusive. The use of quarterly figures has been eliminated because it was too sensitive. (See p. 139 of May 12, 1949, issue.)

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Birmingham.

Scrap Steel Composite

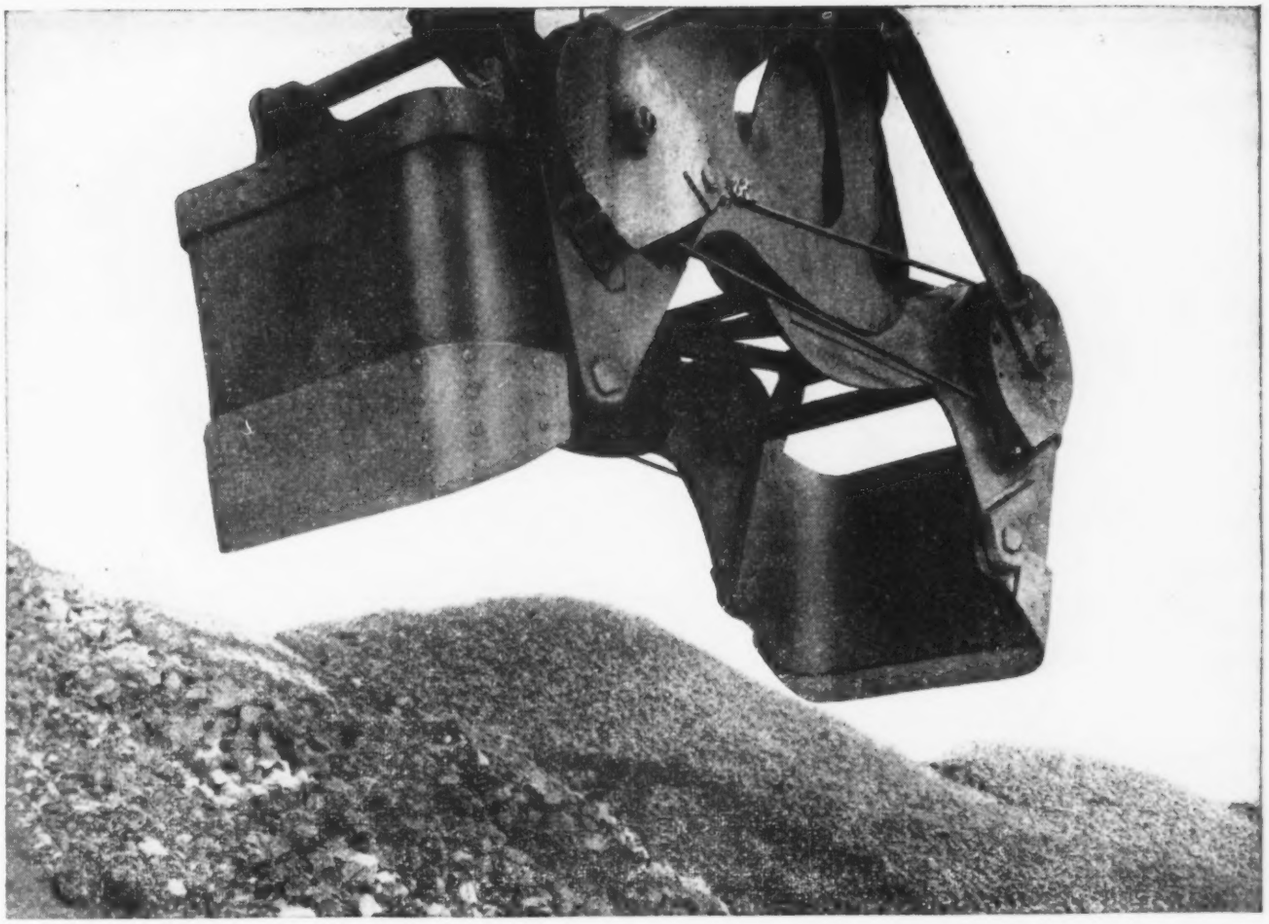
Average of No. 1 heavy melting steel scrap delivered to consumers at Pittsburgh, Philadelphia and Chicago.

Warehouse Price Notes

Base Quantities (Standard unless otherwise keyed): Cold finished bars; 2000 lb or over Alloy bars; 1000 to 1999 lb. All others; 2000 to 9999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may not be combined with each other or with galvanized sheets, for quantity.

Exceptions: (1)500 to 1499 lb. (2)1500 to 3499 lb. (3)6000 lb or over. (4)450 to 1499 lb.

WAREHOUSES		Base price, f.o.b., dollars per 100 lb.													
		Sheets			Strip		Plates	Shapes	Bars		Alloy Bars				
Cities	City Delivery Charge	Hot-Rolled	Cold-Rolled (15 gage)	Galvanized (10 gage)	Hot-Rolled	Cold-Rolled		Standard Structural	Hot-Rolled	Cold-Finished	Hot-Rolled A 4615 As rolled	Hot-Rolled A 4140 Annealed	Cold-Drawn A 4615 As rolled	Cold-Drawn A 4140 Annealed
Baltimore	$.20	5.81	7.17	8.42-8.57	6.42	.....	6.30-6.47	6.47	6.41-6.71	7.18-7.43	.....	.....	.....	.....
Birmingham	.15	5.80	6.65	7.70[1]	5.80	.....	6.10	5.95-6.71	5.80	8.25-8.40	.....	.....	.....	.....
Boston	.20	6.48-6.52	7.35-7.52	8.59-8.74	6.55	8.50[3]	6.75-6.80	6.56-6.75	6.38-6.54	7.63	10.78	11.15-11.18	.....	13.18
Buffalo	.20	5.76-5.80	6.60-6.65	8.40-8.46	6.16-6.21	6.19	6.26-6.37	5.96-6.08	5.76-5.90	6.00-6.95	10.70	11.00-11.07	12.70	12.51-14.42
Chicago	.20	5.80-5.81	6.65	8.05	5.83-5.84	.....	5.95-6.00	5.95-6.98	5.83	6.56-6.92	.....	10.65	.....	12.65
Cincinnati	.15	6.13	6.72	8.52	6.14	.....	6.47	6.42	6.13	7.16	.....	11.07	.....	13.07
Cleveland	.20	5.80-5.81	6.65	8.19	6.00-6.01	.....	6.12-6.17	6.28-	5.89	6.66-6.90	.....	10.79	.....	12.79
Denver		7.17	.....	.....	7.43-7.69	8.90	7.37	7.50-7.80	7.61-7.71	8.24	.....	.....	.....	.....
Detroit	.20	6.00-6.07	6.81-6.92	8.69	6.13	7.99	6.45-6.47	6.12-6.45	6.12-	6.975-7.21	10.72	10.92	12.72	13.02
Houston	.20	6.74-6.79	7.78-7.79	8.68	6.61-6.75	9.80	6.63-7.07	6.66-6.79	6.82-6.98	9.00-9.62	11.90	11.90	.....	13.90
Indianapolis	del'd.	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Kansas City	.20	6.47	7.31	8.50-8.72	6.51	8.07	6.62-6.67	6.62	6.50	7.57	11.15-11.90	11.45-12.20	13.13-13.88	13.43-14.18
Los Angeles	.20	6.60	8.45-8.49	10.55-10.60	6.75-6.78	9.15	6.66-6.71	6.60-6.64	6.60-6.62	8.36-8.69	.....	12.05	.....	14.60
Memphis	.10	6.56	.....	.....	6.60	.....	6.71	6.71	6.57-6.83	7.98-9.98	.....	.....	.....	.....
Milwaukee	.20	5.97-5.98	6.82	8.22	6.00-6.01	.....	6.12-6.17	6.12	6.00	6.83-7.07	.....	10.82	.....	12.82
New Orleans	.15	6.28	7.12	.....	6.32	.....	6.43	6.43	6.31	7.85	.....	.....	.....	.....
New York	.30	6.26-6.69	7.27-7.60	8.31[2]-8.68	6.56-7.05	9.53	6.60-7.19	6.39-6.70	6.59-6.89	7.53-7.73	10.74-10.98	11.04-11.28	12.74-12.97	13.04-13.27
Norfolk	.20	7.10	.....	.....	6.81	.....	6.64	7.25	6.44	8.45	.....	.....	.....	.....
Philadelphia	.25	6.11-6.38	7.13-7.92	8.35-8.79	6.45-7.45	.....	6.24-6.86	6.17-6.42	6.42-6.68	7.45-7.69	10.57-10.74	10.79-11.04	12.74	12.79-13.04
Pittsburgh	.20	5.80-5.81	6.65	8.05-8.45	5.94-5.97	.....	5.95-	5.95	5.83	6.66-6.90	.....	10.65	.....	12.65
Portland	.20	7.60-7.85	9.07-9.45	10.25	7.60-7.65	.....	7.30	7.30	7.35	9.45	.....	.....	.....	.....
Salt Lake City	.20	8.30	.....	10.90[4]	8.45	.....	7.85	8.00	8.40	.....	.....	.....	.....	.....
San Francisco	.15	6.90	8.20	10.00-10.40	6.90	9.25-9.70	6.75-6.85	6.50-6.70	6.70	8.40-8.70	.....	12.05	.....	14.60
Seattle	.20	7.16-7.36	8.23-8.83	9.80-10.00	7.39-7.69	.....	7.04-7.19	6.75-6.95	7.24-7.44	9.37-9.42	.....	11.70	.....	13.70
St. Louis	.20	6.10-6.30	6.94-7.83	8.35-8.39	6.14	9.73	6.35-6.60	6.35	6.13-6.33	6.96-7.40	10.65	10.95	12.65	12.95
St. Paul	.15	6.47	7.31	8.71	6.50	.....	6.61	6.61	6.49	7.32	.....	.....	.....	.....



ORE BUCKET LIFE EXTENDED FROM 6 MONTHS to 7 YEARS

with COAST METALS ALLOY No. 112

Early in 1942, the worn surfaces of the nineteen-foot, manganese ore bucket shown here were hard-faced with 497 pounds of Coast Metals No. 112. Normally, the life of buckets in this service averaged six months. After coating, however, the bucket remained in continuous operation for 27 months, and was then withdrawn because of mechanical failure.

A new bucket, fully protected with CM 112, was put to work in August 1944. This bucket is still handling its daily quota of ore. Only minor patching of small portions of the hardfacing are required every six months. Coast Metals hardfacing on this new bucket has now produced seven years' service—fourteen times the life of an unprotected bucket.

During the past summer, this bucket was joined in secondary service by the original wartime veteran, mechanically repaired, patched with CM, and ready for a second long tour of duty.

Since new ore buckets of this type cost about $7,000 apiece, the remarkable savings made possible by hard-surfacing with CM Alloys can readily be appreciated.

Let us show *you* how we can meet your requirements—help you reduce downtime, cut maintenance bills, increase output, *save money*. Write us today and tell us about your problems. Our Service Engineers will gladly make recommendations based upon your specific needs.

COAST METALS, Inc.

Little Ferry, N. J.

COAST METALS (CANADA), LTD., Hamilton, Ontario

PRODUCERS OF SPECIAL HARD-FACING ALLOYS FOR THE STEEL INDUSTRY

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		INGOTS		BILLETS, BLOOMS, SLABS			PIPE SKELP	PIL-ING	SHAPES STRUCTURALS		STRIP			
		Carbon Forging Net Ton	Alloy Net Ton	Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton		Sheet Steel	Carbon	Hi Str. Low Alloy	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy
EAST	Bethlehem, Pa.					$76.00 *B3*			3.90 *B3*	5.80 *B3*				
	Buffalo, N. Y.			$59.00 *B3*	$70.50 *B3, R3*	$76.00 *B3, R3*		4.675 *B3*	3.90 *B3*	5.80 *B3*	3.725 *B3, R3*	5.10 *B3*	5.70 *B3*	7.90 *B3*
	Claymont, Del.													
	Coatesville, Pa.													
	Conshohocken, Pa.				$77.50 *A2*	$83.00 *A2*					4.125 *A2*		5.90 *A2*	
	Harrisburg, Pa.													
	Hartford, Conn.													
	Johnstown, Pa.			$59.00 *B3*	$70.50 *B3*	$76.00 *B3*			3.90 *B3*	5.80 *B3*	3.725 *B3*			
	Newark, N. J.													
	New Haven, Conn.											5.60 *A5* 5.85 *D1*		
	Phoenixville, Pa.								6.10 *P2*					
	Putnam, Conn.													
	Sparrows Pt., Md.										3.725 *B3*	5.10 *B3*	5.70 *B3*	7.90 *B3*
	Worcester, Mass.													
	Trenton, N. J.											6.45 *R4*		
MIDDLE WEST	Alton, Ill.										4.20 *L1*			
	Ashland, Ky.										3.725 *A7*			
	Canton-Massillon, Ohio				$70.50 *R3*	$76.00 *R3* $78.00 *T5*								
	Chicago, Sterling, Ill.			$59.00 *U1*	$70.50 *U1, R3, W8*	$76.00 *U1, R3, W8*		4.675 *U1*	3.85 *U1, W8*	5.80 *U1*	3.725 *A1, W8* 4.725 *N4*	5.35 *A1*		
	Cleveland, Ohio				$70.50 *R3*							5.10 *A5, J3*		7.45 *J3*
	Detroit, Mich.	$56.00 *R5*	$57.00 *R5*		$73.50 *R5*	$79.00 *R5*					4.025 *G3* 4.40 *M2*	5.30 *G3* 5.45 *M2* 5.60 *D1* 6.05 *D2*	6.30 *G3*	8.15 *G3*
	Duluth, Minn.													
	Gary, Ind. Harbor Indiana			$59.00 *U1*	$70.50 *U1*	$76.00 *U1, Y1*		4.675 *I3*	3.85 *I3, U1*	5.80 *I3, U1* 6.30 *Y1*	3.725 *I3, U1, Y1*	5.35 *I3*	5.65 *I3, U1* 6.15 *Y1*	
	Granite City, Ill.													
	Kokomo, Ind.													
	Middletown, Ohio											5.10 *A7*		
	Niles, Ohio Sharon, Pa.										4.225 *S1*	5.70 *T4* 5.80 *S1*	5.65 *S1*	7.30 *S1*
	Pittsburgh, Pa.	$54.00 *U1*	$57.00 *U1*	$59.00 *U1, J3*	$70.50 *U1, J3*	$76.00 *U1*	3.55 *U1* 3.65 *J3*	4.675 *U1*	3.85 *U1, J3*	5.80 *U1, J3*	3.725 *J3, A7* 3.975 *A3* 4.225 *S7, S9*	5.10 *J3, A7* 5.45 *A3* 5.80 *B4, S7*		
	Portsmouth, Ohio													
	Weirton Wheeling, Follansbee, W. Va.								4.10 *W3*		3.825 *W3*	5.10 *W3*	6.10 *W3*	7.95 *W3*
	Youngstown, Ohio					$76.00 *Y1, C10*	3.55 *U1* *R3*			6.30 *Y1*	3.725 *U1, Y1, R3*	5.10 *R3, Y1* 5.70 *C5* 5.80 *B4*	5.65 *R3, U1* 6.15 *Y1*	7.30 *R3* 7.80 *Y1*
WEST	Fontana, Cal.	$81.00 *K1*	$83.00 *K1*	$78.00 *K1*	$89.50 *K1*	$95.00 *K1*			4.45 *K1*	6.40 *K1*	4.975 *K1*	6.75 *K1*	6.55 *K1*	
	Geneva, Utah				$70.50 *C7*				3.85 *C7*	5.80 *C7*				
	Kansas City Mo.								4.45 *S2*		4.325 *S2*			
	Los Angeles Torrance, Cal.				$89.50 *B2*	$96.00 *B2*			4.45 *C7, B2*	6.35 *B2*	4.475 *C7, B2*	6.85 *C1*	6.40 *B2*	
	Minnequa, Colo.								4.30 *C6*		4.775 *C6*			
	San Francisco Niles, Pittsburg, Cal				$89.50 *B2*				4.40 *B2* 4.56 *P9*	6.30 *B2*	4.475 *C7, B2*		6.40 *B2*	
	Seattle, Wash.				$89.50 *B2*				4.50 *B2*	6.40 *B2*	4.725 *B2*		6.65 *B2*	
SOUTH	Atlanta, Ga.										4.275 *A8*			
	Birmingham Ala. Alabama City, Ala.			$59.00 *T2*					3.85 *T2, R3*	5.80 *T2*	3.725 *T2, R3*			
	Houston, Texas		$65.00 *S2*		$78.50 *S2*	$84.00 *S2*			4.25 *S2*		4.125 *S2*			

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL PRICES

SHEETS									WIRE ROD	TINPLATE†		BLACK PLATE	
Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized *10* ga.	Enameling *12* ga.	Long Terne *10* ga.	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.	Hot-rolled *19* ga.		Cokes* *1.25*-lb. base box	Electro* *0.25*-lb. base box	Holloware Enameling *29* ga.	
													Bethlehem, Pa.
3.775 *B3*	4.575 *B3*				5.675 *B3*	6.925 *B3*							Buffalo, N. Y.
										† Special coated mfg terne deduct 95¢ from 1.25-lb coke base box price. Can-making quality blackplate 55 to 128 lb deduct $2.20 from 1.25-lb coke base box. * COKES: 1.50-lb add 25¢. ELECTRO: 0.50-lb add 25¢; 0.75-lb add 65¢.			Claymont, Del.
													Coatesville, Pa.
4.175 *A2*					5.925 *A2*								Conshohocken, Pa.
													Harrisburg, Pa.
													Hartford, Conn.
									4.325 *B3*				Johnstown, Pa.
													Newark, N. J.
													New Haven, Conn.
													Phoenixville, Pa.
													Putnam, Conn.
3.775 *B3*	4.575 *B3*	5.075 *B3*			5.675 *B3*	6.925 *B3*	7.775 *B3*		4.425 *B3*	$8.80 *B3*	$7.50 *B3*		Sparrows Pt., Md.
									4.625 *A5*				Worcester, Mass.
									4.425 *R4*				Trenton, N. J.
									4.70 *L1*				Alton, Ill.
3.775 *A7*		5.075 *A7*	4.925 *A7*										Ashland, Ky.
		5.075 *R3*											Canton-Massillon Ohio
3.775 *W8*					5.675 *U1*				4.325 *A5, N4, R3*				Chicago, Sterling, Ill.
3.775 *R3, J3*	4.575 *R3, J3*		4.925 *R3*		5.675 *R3, J3*	6.925 *R3, J3*			4.325 *A5*				Cleveland, Ohio
3.975 *G3*	4.775 *G3*				6.225 *G3*	7.475 *G3*							Detroit, Mich.
													Duluth, Minn.
3.775 *I3, U1, Y1*	4.575 *I3, U1, Y1*	5.075 *I3, U1*	4.925 *U1*	5.475 *U1*	5.675 *I3, U1* 6.175 *Y1*	6.925 *I3, U1* 7.425 *Y1*			4.325 *Y1*	$8.70 *U1, I3, Y1*	$7.40 *U1, I3*	6.10 *U1, Y1*	Gary, Ind. Harbor, Indiana
4.30 *G2*	5.275 *G2*	5.50 *G2*	5.625 *G2*								$7.60 *G2*	6.30 *G2*	Granite City, Ill.
		5.475 *C9*											Kokomo, Ind.
	4.575 *A7*		4.925 *A7*	5.475 *A7*									Middletown, Ohio
4.175 *S1*					5.675 *S1*						$7.40 *R3*		Niles, Ohio Sharon, Pa.
3.775 *U1, J3, A7* 3.925 *A3*	4.575 *U1, J3, A7*	5.075 *U1*	4.925 *U1*		5.675 *U1, J3*	6.925 *U1, J3*	7.625 *U1*		4.325 *A5* 4.525 *P6*	$8.70 *U1, J3*	$7.40 *U1, J3*	6.10 *U1*	Pittsburgh, Pa.
									4.525 *P7*				Portsmouth, Ohio
3.775 *W3, W5*	4.575 *W3, W5*	5.075 *W3, W5*		5.475 *W3, W5*	6.025 *W3*	7.275 *W3*				$8.70 *W3, W5*	$7.40 *W3, W5*	6.35 *W5*	Weirton, Wheeling, Follansbee, W. Va.
3.775 *U1, R3, Y1*	4.575 *R3, Y1*	5.775 *R1*	4.925 *Y1*	6.05 *E2*	5.675 *R3, U1* 6.175 *Y1*	6.925 *R3* 7.425 *Y1*		5.65 *E2* 5.825 *R1*	4.325 *Y1*	$8.70 *R3*			Youngstown, Ohio
4.725 *K1*	5.525 *K1*				6.625 *K1*	7.875 *K1*			5.125 *K1*				Fontana, Cal.
3.875 *C7*													Geneva, Utah
													Kansas City, Mo.
4.475 *C7*		5.825 *C7*						5.575 *C7*	5.125 *C7, B2*				Los Angeles, Torrance, Cal.
									4.575 *C6*				Minnequa, Colo.
4.475 *C7*	5.525 *C7*	5.825 *C7*							4.975 *C7*	$9.45 *C7*	$8.15 *C7*		San Francisco, Niles, Pittsburg, Cal.
													Seattle, Wash.
													Atlanta, Ga.
3.575 *T2, R3*	4.575 *T2*	5.075 *T2, R3*			5.675 *T2*			4.925 *R3*	4.325 *T2, R3*	$8.80 *T2*	$7.50 *T2*		Birmingham, Ala. Alabama City Ala.
									4.725 *S2*				Houston, Tex.

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL PRICES

		BARS						PLATES				WIRE
		Carbon Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfgr's. Bright
EAST	Bethlehem, Pa.				4.675 *B3*	6.00 *B3*	5.925 *B3*					
	Buffalo, N. Y.	3.95 *B3,R3*	3.95 *B3,R3*	4.975 *B5*	4.675 *B3,R3*	6.00 *B3,B5*	5.925 *B3*	3.90 *B3*			5.95 *B3*	
	Claymont, Del.							4.35 *C4*		5.35 *C4*		
	Coatesville, Pa.							4.35 *L4*		5.75 *L4*		
	Conshocken, Pa.							4.35 *A2*	4.95 *A2*		6.20 *A2*	
	Harrisburg, Pa.							6.50 *C3*	6.50 *C3*			
	Hartford, Conn.			5.475 *R3*		6.45 *R3*						
	Johnstown, Pa.	3.95 *B3*	3.95 *B3*		4.675 *B3*		5.925 *B3*	3.90 *B3*		5.25 *B3*	5.95 *B3*	5.225 *B3*
	Newark, N. J.			5.375 *W10*		6.35 *W10*						
	New Haven, Conn.											
	Phoenixville, Pa.											
	Putnam, Conn.			5.475 *W10*								
	Sparrows Pt. Md.		3.95 *B3*					3.90 *B3*		5.25 *B3*	5.95 *B3*	5.325 *B3*
	Worcester, Mass.					6.35 *A5*						5.525 *A5*
	Trenton, N. J.											
MIDDLE WEST	Alton, Ill.	4.50 *L1*										5.45 *L1*
	Ashland, Ky.							3.90 *A7*				
	Canton-Massillon	3.95 *R3*		4.925 *R2,R3*	4.675 *R3* 4.72 *T5*	5.99 *T5* 6.00 *R2,R3*						
	Chicago, Sterling, Ill.	3.95 *U,W8, R3* 4.55 *N4*	3.95 *R3* 4.70 *N4*	4.925 *A5,B5, W8,W10*	4.675 *R3, U1, W8*	6.00 *B5,L2, R3,W8,W10* 6.05 *A5*		3.90 *U1,W8*	4.95 *U1*	5.25 *U1*	5.95 *U1*	5.225 *A3, N4,R3* 5.325 *K2* 5.475 *W7*
	Cleveland, Ohio	3.95 *R3*	3.95 *R3*	4.925 *A5,C13*		6.00 *C13* 6.05 *A5*	5.925 *R3*	3.90 *R3,J3*	4.95 *J3*		5.95 *R3,J3*	5.225 *A5, C13,R3*
	Detroit, Mich.	4.10 *R5* 4.30 *G3*		5.075 *R5,P8* 5.175 *P3*	4.825 *R5* 5.625 *G3*	6.15 *R5,P8* 6.20 *P3*	6.675 *G3*	4.45 *G3*			6.90 *G3*	
	Duluth, Minn.											5.252 *A5*
	Gary, Ind. Harbor, Indiana	3.95 *I3, U1, Y1*	3.95 *I3, U1, Y1*	4.925 *L2, M5,R3*	4.675 *I3, U1, Y1*	6.90 *L2,M5, R3,R5*	5.925 *I3, U1,* 6.425 *Y1*	3.90 *I3, U1, Y1*	4.95 *I3*	5.25 *U1*	5.95 *I3, U1* 6.45 *Y1*	5.325 *M4*
	Granite City, Ill.							4.60 *G2*				
	Kokomo, Ind.											5.325 *C9*
	Middletown, Ohio											
	Niles, Ohio Sharon, Pa.							4.15 *S1*		5.70 *S1*	5.95 *S1*	
	Pittsburgh, Pa.	3.95 *U1, J3*	3.95 *U1, J3*	4.925 *A5, J3, W10,R3,C8*	4.675 *U1, J3*	6.00 *W10,C8* 6.05 *A5*	5.925 *U1, J3*	3.90 *U1, J3*	4.95 *U1, J3*	5.25 *U1, J3*	5.95 *U1, J3*	5.225 *A5, J3* 5.475 *P6*
	Portsmouth, Ohio											5.625 *P7*
	Weirton, Wheeling, Follansbee, W. Va.	4.10 *W3*						3.90 *W5* 4.20 *W3*				
	Youngstown, Ohio	3.95 *U1, Y1, R3*	3.95 *U1, Y1, R3*	4.925 *Y1*	4.675 *U1,C10, Y1*	6.00 *C10, Y1*	5.925 *U1* 6.425 *Y1*	3.90 *U1, Y1, R3*			5.95 *R3* 6.45 *Y1*	5.225 *Y1*
WEST	Fontana, Cal.	4.65 *K1*	4.65 *K1*		5.725 *K1*		6.975 *K1*	4.50 *K1*		6.20 *K1*	6.55 *K1*	
	Geneva, Utah							3.90 *C7*			5.95 *C7*	
	Kansas City, Mo.	4.55 *S2*	4.55 *S2*		5.275 *S2*							5.825 *S1*
	Los Angeles, Torrance, Cal.	4.65 *C7,B2*	4.65 *C7,B2*	6.375 *R3*	5.725 *B2*		6.625 *B2*					6.175 *C7,B1*
	Minnequa, Colo.	4.40 *C6*	4.75 *C6*					4.70 *C6*				5.475 *C6*
	San Francisco, Niles, Pittsburg, Cal.	4.65 *C7,P9* 4.70 *B2*	4.65 *C7,P9* 4.70 *B2*				6.675 *B2*					6.[illegible] *C6,C7*
	Seattle, Wash.	4.70 *B2*	4.70 *B2*				6.675 *B2*	4.80 *B2*			6.85 *B2*	
SOUTH	Atlanta, Ga.	4.50 *A8*	4.50 *A8*									5.[illegible] *A8*
	Birmingham, Ala. Alabama City, Ala.	3.95 *T2,R3*	3.95 *T2,R3*				5.925 *T2*	3.90 *T2,R3*			5.95 *T2*	5.225 *T2, R3*
	Houston, Texas	4.35 *S2*	4.35 *S2*		5.075 *S2*			4.30 *S2*				5.625 *S2*

Key to Steel Producers

With Principal Offices

A1 Acme Steel Co., Chicago
A2 Alan Wood Steel Co., Conshohocken, Pa.
A3 Allegheny Ludlum Steel Corp., Pittsburgh
A4 American Cladmetals Co., Carnegie, Pa.
A5 American Steel & Wire Div., Cleveland
A6 Angell Nail & Chaplet Co., Cleveland
A7 Armco Steel Corp., Middletown, O.
A8 Atlantic Steel Co., Atlanta, Ga.

B1 Babcock & Wilcox Tube Co., Beaver Falls, Pa.
B2 Bethlehem Pacific Coast Steel Corp., San Francisco
B3 Bethlehem Steel Co., Bethlehem, Pa.
B4 Blair Strip Steel Co., New Castle, Pa.
B5 Bliss & Laughlin Inc., Harvey, Ill.

C1 Calstrip Steel Corp., Los Angeles
C2 Carpenter Steel Co., Reading, Pa.
C3 Central Iron & Steel Co., Harrisburg, Pa.
C4 Claymont Products Dept., Claymont, Del.
C5 Cold Metal Products Co., Youngstown
C6 Colorado Fuel & Iron Corp., Denver
C7 Columbia-Geneva Steel Div., San Francisco
C8 Columbia Steel & Shafting Co., Pittsburgh
C9 Continental Steel Corp., Kokomo, Ind.
C10 Copperweld Steel Co., Glassport, Pa.
C11 Crucible Steel Co. of America, New York
C12 Cumberland Steel Co., Cumberland, Md.
C13 Cuyahoga Steel & Wire Co., Cleveland

D1 Detroit Steel Corp., Detroit
D2 Detroit Tube & Steel Div., Detroit
D3 Driver Harris Co., Harrison, N. J.

E1 Eastern Stainless Steel Corp., Baltimore
E2 Empire Steel Co., Mansfield, O.

F1 Firth Sterling Inc., McKeesport, Pa.
F2 Fitzsimmons Steel Corp., Youngstown
F3 Follansbee Steel Corp., Follansbee, W. Va.

G1 Globe Iron Co., Jackson, O.
G2 Granite City Steel Co., Granite City, Ill.
G3 Great Lakes Steel Corp., Detroit

H1 Hanna Furnace Corp., Detroit

I2 Ingersoll Steel Div., Chicago
I3 Inland Steel Co., Chicago
I4 Interlake Iron Corp., Cleveland

J1 Jackson Iron & Steel Co., Jackson, O.
J2 Jessop Steel Corp., Washington, Pa.
J3 Jones & Laughlin Steel Corp., Pittsburgh
J4 Joslyn Mfg. & Supply Co., Chicago

K1 Kaiser Steel Corp., Fontana, Cal.
K2 Keystone Steel & Wire Co., Peoria
K3 Koppers Co., Granite City, Ill.

L1 Laclede Steel Co., St. Louis
L2 La Salle Steel Co., Chicago
L3 Lone Star Steel Co., Dallas
L4 Lukens Steel Co., Coatesville, Pa.

M1 Mahoning Valley Steel Co., Niles, O.
M2 McLouth Steel Corp., Detroit
M3 Mercer Tube & Mfg. Co., Sharon, Pa.
M4 Mid-States Steel & Wire Co., Crawfordsville, Ind.
M5 Monarch Steel Co., Inc., Hammond, Ind.
M6 Mystic Iron Works, Everett, Mass.

N1 National Supply Co., Pittsburgh
N2 National Tube Co., Pittsburgh
N3 Niles Rolling Mills Co., Niles, O.
N4 Northwestern Steel & Wire Co., Sterling, Ill.

O1 Oliver Iron & Steel Co., Pittsburgh

P1 Page Steel & Wire Div., Monessen, Pa.
P2 Phoenix Iron & Steel Co., Phoenixville, Pa.
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.
P4 Pittsburgh Coke & Chemical Co., Pittsburgh
P5 Pittsburgh Screw & Bolt Co., Pittsburgh
P6 Pittsburgh Steel Co., Pittsburgh
P7 Portsmouth Div., Detroit Steel Corp. Detroit
P8 Plymouth Steel Co., Detroit
P9 Pacific States Steel Co., Niles, Cal.

R1 Reeves Steel & Mfg. Co., Dover, O.
R2 Reliance Div. Eaton Mfg. Co., Massillon, O.
R3 Republic Steel Corp., Cleveland
R4 Roebling Sons Co. (John A.), Trenton, N. J.
R5 Rotary Electric Steel Co., Detroit

S1 Sharon Steel Corp., Sharon, Pa.
S2 Sheffield Steel Corp., Kansas City
S3 Shenango Furnace Co., Pittsburgh
S4 Simonds Saw & Steel Co., Fitchburg, Mass.
S5 Sloss Sheffield Steel & Iron Co., Birmingham
S6 Standard Forging Corp., Chicago
S7 Stanley Works, New Britain, Conn.
S8 Superior Drawn Steel Co., Monaca, Pa.
S9 Superior Steel Corp., Carnegie, Pa
S10 Sweet's Steel Co., Williamsport, Pa.
S11 Seidelhuber Steel Rolling Mills, Seattle

T1 Tonawanda Iron Div., N. Tonawanda, N. Y.
T2 Tennessees Coal & Iron Div., Birmingham
T3 Tennessee Products & Chem. Corp., Nashville
T4 Thomas Strip Div., Warren, O.
T5 Timken Steel & Tube Div., Canton, O.
T6 Tremont Nail Co., Wareham, Mass.

U1 United States Steel Co., Pittsburgh
U2 Universal-Cyclops Steel Corp., Bridgeville, Pa.

W1 Wallingford Steel Co., Wallingford, Conn.
W2 Washington Steel Corp., Washington, Pa.
W3 Weirton Steel Co., Weirton, W. Va.
W4 Wheatland Tube Co., Wheatland, Pa.
W5 Wheeling Steel Corp., Wheeling, W. Va.
W6 Wickwire Spencer Steel Div., Buffalo
W7 Wilson Steel & Wire Co., Chicago
W8 Wisconsin Steel Co., S. Chicago, Ill.
W9 Woodward Iron Co., Woodward, Ala.
W10 Wyckoff Steel Co., Pittsburgh

Y1 Youngstown Sheet & Tube Co., Youngstown

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence 9-15½ ga.	Fence Posts	Single Loop Bale Ties	Twisted Barbless Wire	Gal. Barbed Wire	Merch. Wire Ann'ld ¢/lb.	Merch. Wire Gal. ¢/lb.
	Col	Col	Col	Col	Col	Col		
Alabama City *R3*†	118	135	...	132	...	144	6.075	6.325
Aliquippa, Pa. *J3*	127	141	...	...	...	148	6.075	6.525
Atlanta *A8*	130	140	...	135	...	149	6.325	6.675
Bartonville *K2*	127	139	140	132	148	148	6.075	6.50
Buffalo *W6*	...	...	...	...	...	...	...	...
Chicago *N4**	118	137	...	132	146	146	6.075	6.40
Cleveland *A6*	...	...	...	...	...	...	...	...
Cleveland *A5*	...	...	...	...	...	...	6.075	6.225
Crawfrdsvl *M4*	130	140	...	134	...	149	6.175	6.55
Donora, Pa. *A5**	118	133	...	132	...	142	6.075	6.225
Duluth *A5*	118	133	...	132	...	142	6.075	6.225
Fairfield, Ala. *T2**	118	133	...	132	...	142	6.075	6.225
Houston *S2*	135	147	...	...	...	156	6.475	6.925
Johnstn, Pa. *B3*	127	...	148	...	149	...	...	6.575
Joliet, Ill. *A5**	118	133	...	132	...	142	6.075	6.225
Kokomo, Ind. *C9*	...	...	142	...	...	...	6.175	6.425
Los Angeles *B2*	...	...	...	...	...	...	7.025	...
Kansas City *S2*	139	...	...	144	...	160	6.675	7.125
Minnequa *C6**	123	146	138	137	...	153	6.325	6.70
Monessen *P6*	...	...	...	...	...	...	...	...
Moline Ill. *R3*	...	...	136	...	...	...	...	...
Pittsburg, Cal. *C7**	137	154	...	156	162	162	7.025	7.125
Monessen *P6*	127	138	...	...	147	147	6.075	6.45
Portsmouth *P7*	132	...	...	...	...	...	6.47	...
Rankin, Pa. *A5**	118	133	...	...	...	142	6.075	6.225
So. Chicago *R3*†	118	135	140	132	...	144	6.075	6.325
S. San Fran. *C6*	...	...	...	156	...	167	7.025	7.40
Sparrows Pt. *B3*	129	...	...	134	151	...	...	6.675
Struthers, O. *Y1*‡	...	...	...	...	...	...	6.075	6.475
Torrance, Cal. *C7**	138	...	...	...	...	...	7.025	...
Worcester *A5**	124	...	...	...	...	...	6.375	6.525
Williamsport, Pa. *S10*	...	...	...	...	...	...	...	...

Cut Nails, carloads base $7.80 per 100 lb. (less 20¢ to jobbers) at Conshohocken Pa. (*A2*) Wheeling, W. Va. (*W5*) $7.80.

* Add 45¢ per 100 lb. on Std. & Coated Nails.

† Zinc extra if not included on Galv. Merch. Wire.

‡ Galv. Merch. Wire based on 15¢ Zinc.

STAINLESS STEELS

Base price, cents per lb., f.o.b. mill. Add 4.7 pct to base and extras.

Product	301	302	303	304	316	321	347	410	416	430
Ingots, rerolling	14.25	15.25	16.75	16.25	24.75	20.00	21.75	12.75	14.75	13.00
Slabs, billets, rerolling	18.50	20.00	22.00	21.00	32.25	26.25	28.50	16.50	20.00	16.75
Forg. discs, die blocks, rings	34.00	34.25	36.75	35.75	53.00	40.25	44.75	28.00	28.50	28.50
Billets, forging	26.25	26.50	28.50	27.75	41.50	31.25	35.00	21.50	22.00	22.00
Bars, wires, structurals	31.25	31.50	34.00	33.00	49.25	37.00	41.50	25.75	26.25	26.25
Plates	33.00	33.25	35.25	35.25	52.00	40.75	45.25	27.00	27.50	27.50
Sheets	41.00	41.25	43.25	43.25	57.00	49.25	53.75	36.50	37.00	39.00
Strip, hot-rolled	26.50	28.25	32.50	30.25	48.75	37.00	41.25	23.50	30.25	24.00
Strip, cold-rolled	34.00	36.75	40.25	38.75	59.00	48.25	52.25	30.50	37.00	31.00

STAINLESS STEEL PRODUCING POINTS—*Sheets:* Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* McKeesport, Pa., *U1;* Washington, Pa., *W2;* (type 316 add 4.5¢) *J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Ft. Wayne, *J4;* Lockport, N. Y., *R4.*

Strip: Midland, Pa., *C11;* Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2* (type 316 add 4.5¢); W. Leechburg, Pa., *A3;* Bridgeville, Pa., *U2;* Detroit, *M2;* Canton-Massillon, O., *R3;* Middletown, O., *A7;* Harrison, N. J., *D3;* Youngstown, *C5;* Lockport, N. Y., *S4;* Sharon, Pa., *S1* (type 301 add ¼¢); Butler, Pa., *A7;* Wallingford, Conn., *W1.*

Bars: Baltimore, *A7;* Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1,F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R3;* Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Lockport, N. Y., *S4;* Canton, O., *T5;* Ft. Wayne, *J4.*

Wires: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2.*

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11.*

Plates: Brackenridge, Pa., *A3* (type 416 add ½¢); Butler, Pa., *A7;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Lockport, N. Y., *S4;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3.*

Forged discs, die blocks, rings: Pittsburgh, *C11;* Syracuse, *C11;* Ferndale, Mich., *A3;* Washington, Pa., *J2.*

Forging billets: Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet, *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11.*

ALLEGHENY LUDLUM—Slightly higher on Type 301; slightly lower on others in 300 series.

WASHINGTON STEEL—Slightly lower on 300 series except where noted.

PIPE AND TUBING

Base discounts f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS					
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½-3 In.		2 In.		2½-3 In.		3½-4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	30.5	8.25	33.5	12.25	35.5	15.75	36.5	16.25	37.0	17.25	37.5	17.75	38.0	18.25						
Youngstown *R3*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25						
Fontana *K1*	21.0	+1.25	24.0	2.75	26.5	6.25	27.0	6.75	27.5	7.75	28.0	8.25	28.5	8.75						
Pittsburgh *J3*	32.5	10.25	35.5	13.25	38.0	15.75	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.75	24.0	2.25	27.0	5.75	29.0	7.75
Alton, Ill. *L1*	31.5	9.25	34.5	13.25	37.0	16.75	37.5	17.25	38.0	18.25	38.5	18.75	39.0	19.25						
Sharon *M3*	32.5	9.25	35.5	13.25	38.0	16.25	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.25						
Pittsburgh *N1*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	.....	27.0	.....	29.0	.....
Wheeling *W5*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25						
Wheatland *W4*	32.5	10.25	35.5	13.25	38.0	15.75	38.5	16.75	39.0	17.25	39.5	17.75	40.0	18.75						
Youngstown *Y1*	32.5	10.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	3.75	27.0	6.75	29.0	8.75
Indiana Harbor *Y1*	31.5	9.25	34.5	13.25	37.0	16.75	37.5	17.25	38.0	18.25	38.5	18.75	39.0	19.25						
Lorain *N2*	32.5	15.25	35.5	14.25	38.0	17.75	38.5	18.25	39.0	19.25	39.5	19.75	40.0	20.25	24.0	3.75	27.0	6.75	29.0	8.75
EXTRA STRONG PLAIN ENDS																				
Sparrows Pt. *B3*	30.25	9.5	34.25	13.5	36.25	17.0	36.75	17.5	37.25	18.5	37.75	19.0	38.25	19.5						
Youngstown *R3*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5						
Fontana *K1*	20.75	.....	24.75	.....	26.75	.....	27.25	.....	27.75	.....	28.25	.....	28.75	.....						
Pittsburgh *J3*	32.25	10.0	36.25	14.0	38.25	16.0	38.75	17.0	39.25	17.5	39.75	18.0	40.25	19.0	23.75	2.0	27.75	6.5	31.25	10.0
Alton, Ill. *L1*	29.25	8.5	33.25	12.5	35.25	16.0	35.75	16.5	36.25	17.5	36.75	18.0	37.25	18.5						
Sharon *M3*	32.25	10.5	36.25	14.5	38.25	17.5	38.75	18.0	39.25	18.5	39.75	19.0	40.25	19.5						
Pittsburgh *N1*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	23.75	.....	27.75	.....	31.25	.....
Wheeling *W5*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5						
Wheatland *W4*	32.25	10.0	36.25	14.0	38.25	16.0	38.75	17.0	39.25	17.5	39.75	18.0	40.25	19.0						
Youngstown *Y1*	32.25	11.5	36.25	15.5	37.75	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	22.5	23.75	4.5	27.75	8.5	31.25	12.0
Indiana Harbor *Y1*	31.25	10.5	35.25	14.5	37.25	17.5	37.75	18.5	38.25	19.5	38.75	20.0	39.25	20.5						
Lorain *N2*	32.25	11.5	36.25	15.5	38.25	19.0	38.75	19.5	39.25	20.5	39.75	21.0	40.25	21.5	23.75	4.5	27.75	8.5	31.25	12.0

Galvanized discounts based on zinc, at 17¢ per lb, East St. Louis. For each 1¢ change in zinc, discounts vary as follows: ½ in., ¾ in., and 1 in., 1 pt.; 1¼ in., 1½ in., 2 in., ¾ pt.. 2½ in., 3 in., ½ pt. Calculate discounts on even cents per lb of zinc, i.e., if zinc is 16.51¢ to 17.50¢ per lb, use 17¢. Jones & Laughlin discounts apply only when zinc price changes 1¢; Threads only buttweld and seamless, 1 pt. higher discount. Plain ends, buttweld and seamless, 3 in. and under, 3¾ pts. higher discount. Buttweld jobbers' discount, 5 pct. St. Louis zinc price now 12.5¢.

COKE

	Net-Ton
Furnace, beehive (f.o.b. oven)	
Connellsville, Pa.	$14.50 to $15.00
Foundry, beehive (f.o.b. oven)	
Connellsville, Pa.	$17.50 to $18.00
Foundry, oven coke	
Buffalo, del'd	$26.58
Chicago, f.o.b.	23.00
Detroit, f.o.b.	24.00
New England, del'd	24.80
Seaboard, N. J., f.o.b.	22.75
Philadelphia, f.o.b.	22.70
Swedeland, Pa., f.o.b.	22.60
Painesville, Ohio, f.o.b.	24.00
Erie, Pa., f.o.b.	23.50
Cleveland, del'd	25.72
Cincinnati, del'd	25.06
St. Paul, f.o.b.	22.50
St. Louis	35.40
Birmingham, del'd	21.69
Neville Island	23.00
Lone Star, Tex., f.o.b.	18.50

ELECTRICAL SHEETS

22 Ga. H-R cut length F.o.b. Mill Cents Per Lb.	Armature	Elec.	Motor	Dynamo	Transf. 72	Transf. 65	Transf. 58
Beech Bottom *W5*	....	7.85	9.10	9.90	10.45	11.00	11.70
Brackenridge *A3*	7.35	7.85	9.10	9.90	10.45	11.00	11.70
Granite City *G2*	....	8.55	9.80	....	....	....	....
Ind. Harbor *I3*	7.35	7.85	9.10	....	....	....	....
Mansfield *E2*	7.35	7.85	9.10	9.90	....	....	....
Niles, O. *N3*	7.35	7.85	....	....	....	....	....
Vandergrift *U1*	7.35	7.85	9.10	9.90	10.45	11.00	11.70
Warren, O. *R3*	7.35	7.85	9.10	....	....	....	....
Zanesville *A7*	7.35	7.85	9.10	9.90	10.45	11.00	11.70

CAST IRON WATER PIPE

	Per Net Ton
6 to 24-in., del'd Chicago	$105.30 to $103.80
6 to 24-in., del'd N.Y.	108.50 to 109.50
6 to 24-in., Birmingham	91.50 to 96.00
6-in. and larger, f.o.b. cars, San Francisco, Los Angeles, for all rail shipments; rail and water shipments less	$123.00 to $130.00

Class "A" and gas pipe, $5 extra; 4-in. pipe is $5 a ton above 6-in.

BOILER TUBES

$ per 100 ft. carload lots, cut 10 to 24 ft. F.o.b. Mill	Size OD-In.	Size B.W. Ga.	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.	Elec. Weld C.D.
Babcock & Wilcox	2	13	23.93	28.14	23.19	27.28
	2½	12	32.17	37.83	31.19	36.67
	3	12	35.78	42.11	34.69	40.82
	3½	11	44.72	52.65	43.36	51.65
	4	10	55.52	65.31	53.83	63.32
National Tube	2	13	22.81	27.94	22.23	.....
	2½	12	31.28	38.31	30.51	.....
	3	12	35.87	43.93	34.98	.....
	3½	11	42.56	52.12	.....	.....
	4	10	54.02	66.16	.....	.....
Pittsburgh Steel	2	13	.....	28.58	.....	.....
	2½	12	32.16	39.19	.....	.....
	3	12	36.87	44.93	.....	.....
	3½	11	43.76	53.32	.....	.....
	4	10	.....	67.68	.....	.....

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Foundry	Malleable	Bessemer	Low Phos.	Bl. Furnace Silvery
Bethlehem *B3*	56.50	57.00	57.50	58.00	.....	.....
Birmingham *R3*	50.88	51.38	.....	.....	.....	.....
Birmingham *W9*	50.88	51.38	.....	.....	.....	.....
Birmingham *S5*	50.88	51.38	.....	.....	.....	.....
Buffalo *R3*	54.50	55.00	55.50	.....	.....	.....
Buffalo *H1*	54.50	55.00	55.50	.....	.....	66.75
Buffalo *W6*	54.50	55.00	55.50	.....	.....	.....
Chicago *I4*	54.50	55.00	55.00	55.50	.....	.....
Cleveland *A5*	54.50	55.00	55.00	55.50	59.50	.....
Cleveland *R3*	54.50	55.00	55.00	.....	.....	.....
Daingerfield, Tex. *L3*	50.50	51.00	51.00	.....	.....	.....
Duluth *I4*	54.50	55.00	55.00	55.50	.....	.....
Erie *I4*	54.50	55.00	55.00	55.50	.....	.....
Everett, Mass. *M6*	.....	59.25	59.75	.....	.....	.....
Fontana *K1*	60.50	61.00	.....	.....	.....	.....
Geneva, Utah *C7*	54.50	55.00	.....	.....	.....	.....
Granite City, Ill. *K3*	56.40	56.90	57.40	.....	.....	.....
Hubbard, Ohio *Y1*	54.50	55.00	55.00	.....	.....	.....
Jackson, Ohio *J1,G1*	.....	.....	.....	.....	.....	65.50
Minnequa *C6*	56.50	57.50	57.50	.....	.....	.....
Monessen *P6*	56.50	.....	.....	.....	.....	.....
Neville Island *P4*	54.50	55.00	55.00	55.50	.....	.....
Pittsburgh *U1*	54.50	.....	.....	55.50	.....	.....
Sharpsville *S3*	54.50	55.00	55.00	55.50	.....	.....
Steelton *B3*	56.50	57.00	57.50	58.00	62.50	.....
Swedeland *A2*	58.50	59.00	59.50	60.00	.....	.....
Toledo *I4*	54.50	55.00	55.00	55.50	.....	.....
Troy, N. Y. *R3*	56.50	57.00	57.50	.....	62.50	.....
Youngstown *Y1*	54.50	55.00	55.00	55.50	.....	.....
N. Tonawanda, N. Y. *T1*	.....	55.00	55.50	.....	.....	.....

DIFFERENTIALS: Add 50¢ per ton for each 0.25 pct silicon over base, (1.75 to 2.25 pct, except low phos., 1.75 to 2.00 pct), 50¢ per ton for each 0.50 pct manganese over 1 pct, $2 per ton for 0.5 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel. Subtract 38¢ per ton for phosphorus, content 0.70 pct and over. Silvery Iron: Add $1.50 per ton net for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 17 pct. $1 per ton for 0.75 pct or more phosphorus, manganese as above. Bessemer ferrosilicon prices are $1 over comparable silvery iron.

C-R SPRING STEEL

Cents Per Lb. F.o.b. Mill	CARBON CONTENT 0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Bridgeport, Conn.*S7	5.80	7.65	8.25	10.20	12.50
Carnegie, Pa. *S9*	.....	7.65	8.25	10.20	12.50
Cleveland *A5*	5.10	7.30	8.25	10.20	12.50
Detroit *D1*	6.45	7.50	8.10	.....	.....
New Castle, Pa. *B4*	5.80	7.65	8.25	10.20	.....
New Haven, Conn. *D1*	6.70	7.60	8.20	.....	.....
Sharon, Pa. *S1*	5.80	7.65	8.25	10.20	12.50
Trenton, N. J. *R4*	.....	7.95	8.55	10.50	12.80
Warren, Ohio *T4*	6.20	7.65	8.25	10.20	12.50
Weirton, W. Va. *W3*	5.80	7.65	8.25	10.20	12.50
Worcester, Mass. *A5*	5.40	7.60	8.55	10.50	12.80
Youngstown *C5*	.....	7.65	8.25	10.20	12.50

*Sold on Pittsburgh base.

EASY

TO READ

EASY TO OPERATE

And you get long, *accurate* service with these Fairbanks-Morse built-in advantages.

Fairbanks-Morse Dial Scales speed weighing because they're designed for easiest reading. The weighmen can read the correct weight at a glance. Even with drop weights applied, weights are still read right at the point of the indicator . . . no mental calculations are required. It's easier . . . faster . . . more accurate. Human errors are eliminated.

Check these features that mean fast, accurate weighing, with your Fairbanks-Morse weighing expert or write Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.

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FAIRBANKS-MORSE

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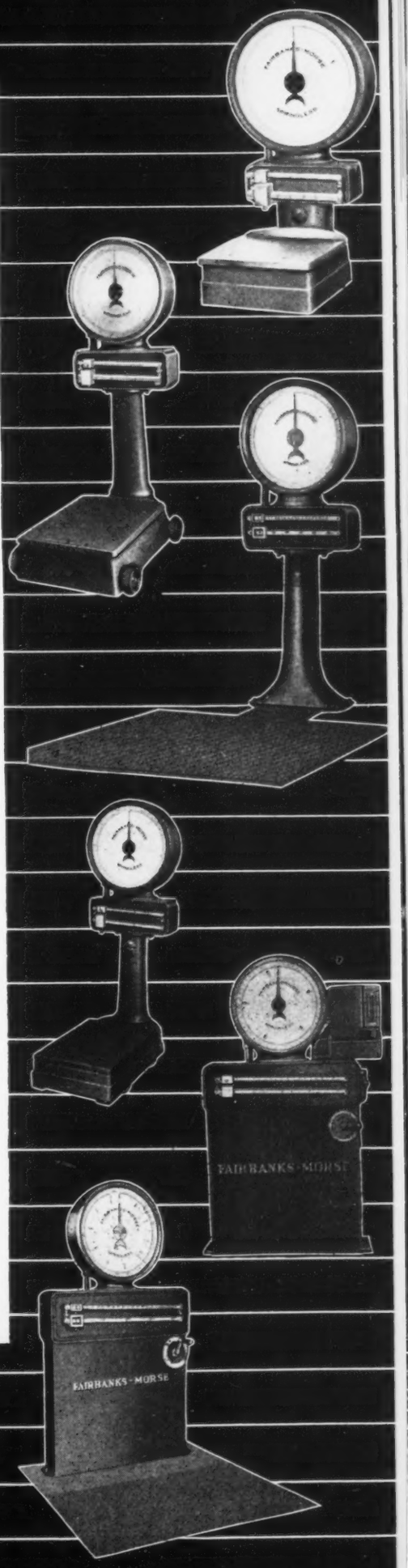
PUMPS • HOME WATER SERVICE EQUIPMENT • RAIL CARS
FARM MACHINERY • MAGNETOS



RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Screw Spikes	Tie Plates	Track Bolts Treated
Bessemer *U1*	3.775	4.25	4.925	....	....	....	....
Chicago *R3*	....	....	....	6.65	....	....	....
Cleveland *R3*	....	....	....	....	....	....	....
Ensley *T2*	3.775	4.25	....	....	....	....	....
Fairfield *T2*	....	4.25	....	6.65	....	4.775	....
Gary *U1*	3.775	4.25	....	....	....	4.775	....
Ind. Harbor *I3*	3.775	....	4.925	6.65	....	4.775	....
Johnstown *B3*	....	4.25	....	....	....	....	....
Joliet *U1*	....	4.25	4.925	....	....	....	....
Kansas City *S2*	....	....	....	....	....	....	....
Lackawanna *B3*	3.775	4.25	4.925	....	....	4.775	....
Lebanon *B3*	....	....	....	6.65	....	....	....
Minnequa *C6*	3.775	4.75	4.925	6.65	....	4.775	9.85
Pittsburgh *R3*	....	....	....	....	....	....	....
Pittsburgh *O1*	....	....	....	....	....	....	....
Pittsburgh *P5*	....	....	....	....	....	....	....
Pittsburgh *J3*	....	....	....	6.65	....	....	....
Pitt'g, Cal. *C7*	....	....	....	....	....	4.925	....
Seattle *B2*	....	....	....	7.15	....	4.925	....
Steelton *B3*	3.775	....	4.925	....	....	4.775	....
Struthers *Y1*	....	....	....	6.65	....	....	....
Torrance *C7*	....	....	....	....	....	4.925	....
Youngstown *R3*	....	....	....	6.65	....	....	....

TOOL STEEL

F.o.b. mill

Add 4.7 pct to base and extras.

W	Cr	V	Mo	Co	Base per lb
18	4	1	—	—	$1.505
18	4	1	—	5	$2.13
18	4	2	—	—	$1.65
1.5	4	1.5	8	—	81.0¢
6	4	2	6	—	96.5¢

High-carbon chromium ..... 63.5¢
Oil hardened manganese ..... 35¢
Special carbon ..... 32.5¢
Extra carbon ..... 27¢
Regular carbon ..... 23¢

Warehouse prices on and east of Mississippi are 3.5¢ per lb. higher. West of Mississippi, 5.5¢ higher.

CLAD STEEL

Add 4.7 pct to base and extras.

Stainless-carbon	Plate	Sheet
No. 304, 20 pct.		
Coatesville, Pa. *L4*	*29.5	
Washington, Pa. *J2*	*29.5	
Claymont, Del. *C4*	*28.00	
Conshohocken, Pa. *A2*		*27.50
New Castle, Ind. *I2*	*29.77	*26.24
Nickel-carbon		
10 pct Coatesville, Pa. *L4*	32.5	
Inconel-carbon		
10 pct Coatesville, Pa. *L4*	40.5	
Monel-carbon		
10 pct Coatesville, Pa. *L4*	33.5	
No. 302 Stainless-copper stainless, Carnegie, Pa. *A4*		77.00
Aluminized steel sheets, hot dip, Butler, Pa. *A7*		7.75

* Includes annealing and pickling, or sandblasting.

ELECTRODES

Cents per lb, f.o.b., plant threaded electrodes with nipples, unboxed

Diam. in in.	Length in in.	Cents Per lb.
	GRAPHITE	
17, 18, 20	60, 72	17.85
8 to 16	48, 60, 72	17.85
7	48, 60	19.57
6	48, 60	20.95
4, 5	40	21.50
3	40	22.61
2½	24, 30	23.15
2	24, 30	25.36
	CARBON	
40	100, 110	8.45
35	65, 110	8.45
30	65, 84, 110	8.45
24	72 to 104	8.45
20	84, 90	8.45
17	60, 72	8.45
14	60, 72	9.02
10, 12	60	9.30
8	60	9.58

FLUORSPAR

Washed gravel, f.o.b. Rosiclaire, Ill. Price, net ton; Effective CaF_2 content:

70% or more $43.00
60% or less 40.00

BOLTS, NUTS, RIVETS, SCREWS

Consumer Prices

(Base, discount, f.o.b. mill, Pittsburgh, Cleveland, Birmingham or Chicago)

Nuts, Hot Pressed, Cold Punched—Sq.

Pct Off List

	Less Keg.	K. Reg.	Less Keg.	K. Hvy.
½ in. & smaller	15	28½	15	28½
9/16 in. & ⅝ in.	12	25	6½	21
¾ in. to 1½ in. inclusive	9	23	1	16½
1⅝ in. & larger	7½	22	1	16½

Nuts, Hot Pressed—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	16½	29½	6½	21
¾ in. to 1½ in. inclusive	12	25	2	17½
1⅝ in. & larger	8½	23	2	17½

Nuts, Cold Punched—Hexagon

½ in. & smaller	26	37	22	34
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	19½	31½	12	25
1⅝ in. & larger	8½	23	2	17½

Nuts, Semi-Finished—Hexagon

	Reg.		Hvy.	
½ in. & smaller	35	45	28½	29½
9/16 in. & ⅝ in.	23	35	17½	30½
¾ in. to 1½ in. inclusive	24	36	15	28½
1⅝ in. & larger	13	26	8½	23
	Light			
7/16 in. & smaller	35	45		
½ in. thru ⅝ in.	28½	39½		
¾ in. to 1½ in. inclusive	26	37		

Stove Bolts

Pct Off List

Packaged, steel, plain finished 48—10
Packaged, plain finish ..... 31—10
Bulk, plain finish** 62*

*Discounts apply to bulk shipments in not less than 15,000 pieces of a size and kind where length is 3-in. and shorter; 5000 pieces for lengths longer than 3-in. For lesser quantities, packaged price applies.

**Zinc, Parkerized, cadmium or nickel plated finishes add 6¢ per lb net. For black oil finish, add 2¢ per lb net.

Rivets

Base per 100 lb

½ in. & larger $7.85

Cap and Set Screws

(In bulk) *Pct Off List*

Hexagon head cap screws, coarse or fine thread, ¼ in. thru ⅝ in. x 6 in., SAE 1020, bright	54
¾ in. thru 1 in. up to & including 6 in.	48
¼ in. thru ⅝ in. x 6 in. & shorter high C double heat treat	46
¾ in. thru 1 in. up to & including 6 in.	41
Milled studs	35
Flat head cap screws, listed sizes	16
Fillister head cap, listed sizes	34
Set screws, sq head, cup point, 1 in. diam. and smaller x 6 in. & shorter	53

Machine and Carriage Bolts

Pct Off List

	Less Case	C.
½ in. & smaller x 6 in. & shorter	15	28½
9/16 in. & ⅝ in. x 6 in. & shorter	18½	30½
¾ in. & larger x 6 in. & shorter	17½	29½
All diam. longer than 6 in.	14	27½
Lag, all diam. x 6 in. & shorter	33	35
Lag, all diam. longer than 6 in.	21	33
Plow bolts	34	....

REFRACTORIES

Fire Clay Brick

Carloads, per 1000

First quality, Ill., Ky., Md., Mo., Ohio, Pa. (except Salina, Pa., add $5) $94.60
No. 1 Ohio 88.00
Sec. quality, Pa., Md., Ky., Mo., Ill. 88.00
No. 2 Ohio 79.20
Ground fire clay, net ton, bulk (except Salina, Pa., add $1.50) 13.75

Silica Brick

Mt. Union, Pa., Ensley, Ala. $94.60
Childs, Pa. 99.00
Hays, Pa. 100.10
Chicago District 104.50
Western Utah and Calif. 111.10
Super Duty, Hays, Pa., Athens, Tex., Chicago 111.10
Silica cement, net ton, bulk, Eastern (except Hays, Pa.) 16.50
Silica cement, net ton, bulk, Hays, Pa. 18.70
Silica cement, net ton, bulk, Ensley, Ala. 17.60
Silica cement, net ton, bulk, Chicago District 17.60
Silica cement, net ton, bulk, Utah and Calif. 24.70

Chrome Brick

Per Net Ton

Standard chemically bonded balt., Chester $82.00

Magnesite Brick

Standard, Baltimore $104.00
Chemically bonded, Baltimore 93.00

Grain Magnesite

St. ¾-in. grains

Domestic, f.o.b. Baltimore in bulk fines removed $62.70
Domestic, f.o.b. Chewalah, Wash., in bulk 36.30
in sacks 41.80

Dead Burned Dolomite

F.o.b. producing points in Pennsylvania, West Virginia and Ohio per net ton, bulk Midwest, add 10¢; Missouri Valley, add 20¢... $13.75

LAKE SUPERIOR ORES

51.50% Fe; natural content, delivered lower Lake ports. Prices effective July 26, 1952

Gross Ton

Old range, bessemer $9.45
Old range, nonbessemer 9.30
Mesabi, bessemer 9.20
Mesabi, nonbessemer 9.05
High phosphorus 9.05

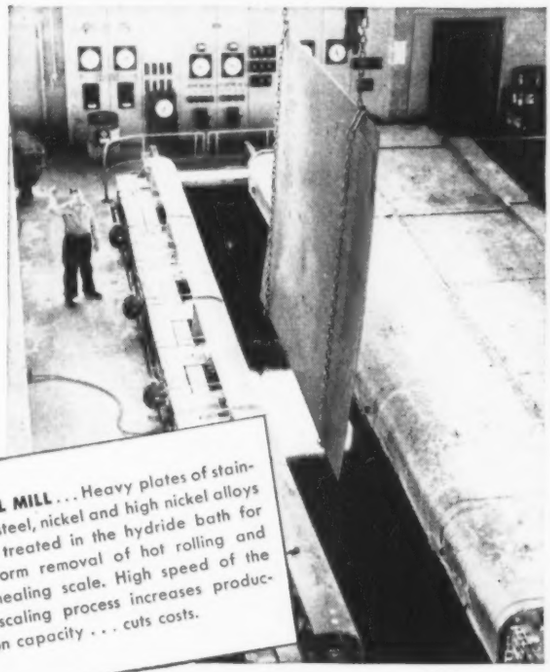
After adjustments for analysis, prices will be increased or decreased as the case may be for increases or decreases after Dec. 1, 1950, in Lake vessel rates, upper Lake rail freights, dock handling charges and taxes thereon.

METAL POWDERS

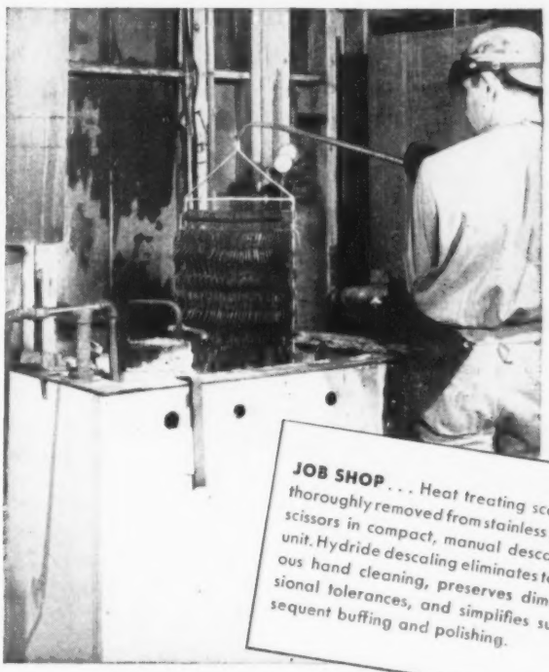
Per pound, f.o.b. shipping point, in ton lots, for minus 100 mesh.

Swedish sponge iron c.l.f. New York, ocean bags... 10.9¢
Canadian sponge iron, del'd. in East ..... 13.0¢
Domestic sponge iron, 98+% Fe, carload lots ..... 15.5¢ to 17.0¢
Electrolytic iron, annealed, 99.5+% Fe ..... 44.0¢
Electrolytic iron, unannealed, minus 325 mesh, 99+% Fe 60.0¢
Hydrogen reduced iron, minus 300 mesh, 98+% Fe. 63.0¢ to 80.0¢
Carbonyl iron, size 5 to 10 micron, 98%, 99.8+% Fe. 83.0¢ to $1.48
Aluminum ..... 31.5¢
Brass, 10 ton lots ..... 30.00¢ to 33.25¢
Copper, electrolytic 10.75¢ plus metal value
Copper reduced ...10.00¢ plus metal value
Cadmium, 100-199 lb 95¢ plus metal value
Chromium, electrolytic, 99% min., and quantity, del'd $3.50
Lead .....7.5¢ to 12.0¢ plus metal value
Manganese ..... 57.0¢
Molybdenum, 99% $2.75
Nickel, unannealed ..... 88.0¢
Nickel, annealed ..... 95.0¢
Nickel, spherical, unannealed 92.0¢
Silicon ..... 38.5¢
Solder powder..7.0¢ to 9.0¢ plus met. value
Stainless steel, 302 ..... 83.00¢
Stainless steel, 316 ..... $1.10
Tin .....14.00¢ plus metal value
Tungsten, 99% (65 mesh).. $6.00
Zinc, 10 ton lots .....23.0¢ to 30.5¢

NO SECTION TOO BIG . . . NO PART TOO SMALL



STEEL MILL . . . Heavy plates of stainless steel, nickel and high nickel alloys are treated in the hydride bath for uniform removal of hot rolling and annealing scale. High speed of the descaling process increases production capacity . . . cuts costs.



JOB SHOP . . . Heat treating scale is thoroughly removed from stainless steel scissors in compact, manual descaling unit. Hydride descaling eliminates tedious hand cleaning, preserves dimensional tolerances, and simplifies subsequent buffing and polishing.

FOR THE
DU PONT SODIUM HYDRIDE DESCALING PROCESS

FROM OUNCES TO TONS! That's the capacity range of current sodium hydride installations in mills, factories and job shops of all sizes. And with each unit, the same results—speedy, uniform descaling of many different metals at a saving in time and material. Hydride descaling leaves surfaces clean and bright . . . does not attack base metal. Yet, scale is thoroughly removed from even the most intricate part by the penetrating bath action.

FOR MORE INFORMATION about the Du Pont Sodium Hydride Descaling Process, just get in touch with our nearest district or sales office or send the coupon below to: E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington 98, Delaware.

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*Barada & Page, Inc.

OUTSTANDING ADVANTAGES OF THE SODIUM HYDRIDE PROCESS

- **HIGH-SPEED OPERATION**—Descales in shortest practicable time cycle . . . can be adapted to manual, conveyorized or continuous operation.
- **NO LOSS OF BASE METAL**—Bath action is reducing. Reaction stops when oxygen is removed from scale, eliminates pickling losses, etching and pitting.
- **ECONOMICAL TO OPERATE**—Permits savings in acid and metal . . . handles large volume of work in small space . . . is non-electrolytic.
- **HANDLES DIFFERENT METALS**—Alloy steel, stainless steel, nickel, copper, titanium and cobalt bearing alloys can be efficiently descaled—even in the same bath.
- **UNIFORM DESCALING**—On all surfaces without need for special racking procedures.
- **USES LOW-COST EQUIPMENT**—(Carbon Steel Tanks). NO HYDROGEN EMBRITTLEMENT.

E. I. du Pont de Nemours & Co. (Inc.)
Electrochemicals Department
Wilmington 98, Delaware

Please send me more information on the Du Pont Hydride Descaling Process: advantages, applications, equipment used. I am interested in cleaning_____products.

*Name*_____ *Position*_____

*Firm*_____

*Street and No.*_____

*City*_____ *State*_____

DU PONT
Sodium hydride process for positive descaling

DU PONT REG. U.S. PAT. OFF. 150th Anniversary

BETTER THINGS FOR BETTER LIVING . . . THROUGH CHEMISTRY

Ferrochrome

Contract prices, cents per pound, contained Cr, lump size, bulk in carloads delivered. (65-72% Cr, 2% max. Si.)

0.06% C ...	30.50	0.20% C ...	29.50
0.10% C ...	30.00	0.50% C ...	29.25
0.15% C ...	29.75	1.00% C ...	29.00
2.00% C			28.75
65-69% Cr, 4-9% C			22.00
62-66% Cr, 4-6% C, 6-9% Si			22.60

S. M. Ferrochrome

Contract price, cents per pound, chromium contained, lump size, delivered.

High carbon type: 60-65% Cr, 4-6% Si, 4-6% Mn, 4-6% C.

Carloads	21.60
Ton lots	23.75
Less ton lots	25.25

Low carbon type: 62-66% Cr, 4-6% Si, 4-6% Mn, 1.25% Max. C.

Carloads	27.75
Ton lots	30.05
Less ton lots	31.85

High-Nitrogen Ferrochrome

Low-carbon type: 67-72% Cr, 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome price schedule. Add 5¢ for each additional 0.25% N.

Chromium Metal

Contract prices, per lb chromium contained, packed, delivered, ton lots, 97% min. Cr, 1% max. Fe.

0.10% max. C	$1.14
0.50% max. C	1.10
9 to 11% C	1.08

Low Carbon Ferrochrome Silicon

(Cr 34-41%, Si 42-49%, C 0.05% max.) Contract price, carloads, f.o.b. Niagara Falls, freight allowed; lump 4-in. x down, bulk 2-in. x down, 21.75¢ per lb of contained Cr plus 12.40¢ per lb of contained Si.

Bulk 1-in. x down, 21.90¢ per lb contained Cr plus 12.60¢ per lb contained Si.

Calcium-Silicon

Contract price per lb of alloy, dump delivered.

30-33% Ca, 60-65% Si, 3.00% max. Fe.

Carloads	19.00
Ton lots	22.10
Less ton lots	23.60

Calcium-Manganese—Silicon

Contract prices, cents per lb of alloy lump, delivered.

16-20% Ca, 14-18% Mn, 53-59% Si.

Carloads	20.00
Ton lots	23.30
Less ton lots	23.30

CMSZ

Contract price, cents per lb of alloy, delivered.

Alloy 4: 45-49% Cr, 4-6% Mn, 18-21% Si, 1.25-1.75% Zr, 3.00-4.5% C.

Alloy 5: 50.56% Cr, 4-6% Mn, 13.50-16.00% Si, 0.75 to 1.25% Zr, 3.50-5.00% C.

Ton lots	20.75
Less ton lots	22.00

SMZ

Contract price, cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe, ¼ in. x 18 mesh.

Ton lots	17.50
Less ton lots	19.50

V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. V-5: 38-42% Cr, 17-19% Si, 8-11% Mn.

Ton lots	16.50
Less ton lots	17.75

Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis. Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.

Carload packed	18.00
Ton lots to carload packed	19.00
Less ton lots	20.50

Ferromanganese

78-82% Mn, maximum contract base price, gross ton, lump size.

F.o.b. Niagara Falls, Alloy, W. Va., Ashtabula, O. $225
F.o.b. Johnstown, Pa. $227
F.o.b. Sheridan, Pa. $225
F.o.b. Etna, Clairton, Pa. $228

Add $2.80 for each 1% above 82% Mn, subtract $2.80 for each 1% below 78% Mn.

Briquets—Cents per pound of briquet, delivered, 66% contained Mn.

Carload, bulk	12.45
Ton lots, packed	14.05

Spiegeleisen

Contract prices gross ton; lump, f.o.b.

	16-19% Mn 3% max. Si	19-21% Mn 3% max. Si
Palmerton, Pa.	$84.00	$85.00
Pgh. or Chicago	84.00	85.00

Manganese Metal

Contract basis, 2 in. x down, cents per pound of metal, delivered.

96% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.

Carload, packed	36.95
Ton lots	38.45

Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, cents per pound.

Carloads	30.00
Ton lots	32.00
Less ton lots	34.00 to 37.00

Low-Carbon Ferromanganese

Contract price, cents per pound Mn contained, lump size, del'd Mn 85-90%.

	Carloads	Ton	Less
0.07% max. C, 0.06% P, 90% Mn	28.45	30.30	31.50
0.07% max. C	27.95	29.80	31.00
0.15% max. C	27.45	29.30	30.50
0.30% max. C	26.95	28.80	30.00
0.50% max. C	26.45	28.30	29.50
0.75% max. C, 80-85% Mn, 5.0-7.0% Si	23.45	25.30	26.50

Medium Carbon Ferromanganese

Mn 80% to 85%, C 1.25 to 1.50. Contract price, carloads, lump, bulk, delivered, per lb of contained Mn 21.35¢

Silicomanganese

Contract basis, lump size, cents per pound of metal, delivered, 65-68% Mn, 18-20% Si, 1.5% max. C. For 2% max C, deduct 0.2¢.

Carload bulk	11.40
Ton lots	13.05
Briquet, contract basis carlots, bulk delivered, per lb of briquet	12.65
Ton lots, packed	14.25

Silvery Iron (electric furnace)

Si 14.01 to 14.50 pct, f.o.b. Keokuk, Iowa, or Wenatchee, Wash., $95.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., $93.00. Add $1.055 per ton for each additional 0.50% Si up to and including 17%. Add $1.00 for each 0.50% Mn over 1%.

Silicon Metal

Contract price, cents per pound contained Si, lump size, delivered, for ton lots packed.

96% Si, 2% Fe	18.00
97% Si, 1% Fe	18.50

Silicon Briquets

Contract price, cents per pound of briquet bulk, delivered, 40% Si, 2 lb Si briquets.

Carloads, bulk	6.95
Ton lots	8.55

Electric Ferrosilicon

Contract price, cents per pound contained Si, lump, bulk, carloads, delivered.

25% Si ...	10.60	75% Si ...	14.30
50% Si ...	12.40	85% Si ...	15.55
90-95% Si			17.00

Calcium Metal

Eastern zone contract prices, cents per pound of metal, delivered.

	Cast	Turnings	Distilled
Ton lots	$2.05	$2.95	$3.75
Less ton lots	2.40	3.30	4.55

Ferrovanadium

35-55% contract basis, delivered, per pound, contained V.

Openhearth	$3.00-$3.10
Crucible	3.10- 3.20
High speed steel (Primos)	3.20- 3.25

Alsifer, 20% Al, 40% Si, 40% Fe, contract basis, f.o.b. Suspension Bridge, N. Y.

Carloads	9.90
Ton lots	11.30

Calcium molybdate, 46.3-46.6% f.o.b. Langeloth, Pa., per pound contained Mo $1.15

Ferrocolumbium, 50-60% 2 in. x D, contract basis, delivered per pound contained Cb.

Ton lots	$4.90
Less ton lots	4.95

Ferro-Tantalum-Columbium, 20% Ta, 40% Cb, 0.30 C. Contract basis, delivered, ton lots, 2 in. x D, per lb of contained Cb plus Ta $3.75

Ferromolybdenum, 55-75%, f.o.b. Langeloth, Pa., per pound contained Mo. $1.32

Ferrophosphorus, electrolytic, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., $3 unitage, per gross ton $65.00
10 tons to less carload $75.00

Ferrotitanium, 40% regular grade, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.35

Ferrotitanium, 25%, low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Bridgeville, Pa., freight allowed, ton lots, per lb contained Ti $1.50
Less ton lots 1.55

Ferrotitanium, 15 to 18%, high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton $177.00

Ferrotungsten, standard, lump or ¾ x down, packed, per pound contained W5, ton lots, delivered $5.00

Molybdic oxide, briquets or cans, per lb contained Mo, f.o.b. Langeloth, Pa. $1.14
bags, f.o.b. Washington, Pa., Langeloth, Pa. $1.13

Simanal, 20% Si, 20% Mn, 20% Al, contract basis, f.o.b. Philo, Ohio, freight allowed, per pound

Carload, bulk lump	14.50¢
Ton lots, bulk lump	15.75¢
Less ton lots, lump	16.25¢

Vanadium Pentoxide, 86-89% V_2O_5 contract basis, per pound contained V_2O_5 $1.23

Zirconium, 35-40%, contract basis, f.o.b. plant, freight allowed, per pound of alloy.
Ton lots 21.00¢

Zirconium, 12-15%, contract basis, lump, delivered, per lb of alloy.
Carload, bulk 7.00¢

Boron Agents

Borosil, contract prices per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B, 3-4%, Si, 40-45%, per lb contained B.... $5.25

Bortam, f.o.b. Niagara Falls

Ton lots, per pound	45¢
Less ton lots, per pound	50¢

Corbortam, Ti, 15-21%, B, 1-2%, Si, 2-4%, Al, 1-2% C, 4.5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.
Ton lots, per pound 10.00¢

Ferroboron, 17.50% min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D. Ton lots.... $1.30
F.o.b. Wash., Pa.; 100 lb up

10 to 14% B	.35
14 to 19% B	1.20
19% min. B	1.50

Grainal, f.o.b. Bridgeville, Pa., freight allowed, 100 lb and over.

No. 1	$1.00
No. 6	65¢
No. 79	50¢

Manganese - Boron, 75.00% Mn, 15-20% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd

Ton lots	$1.46
Less ton lots	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, delivered
Less ton lots $1.30

Silcaz, contract basis, delivered.
Ton lots 45.00¢

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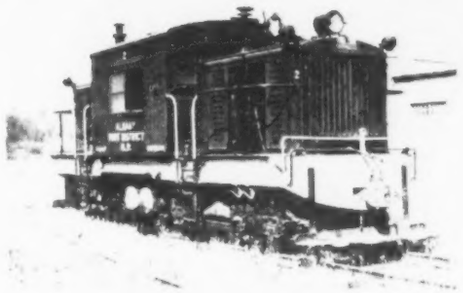

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for holes as small as .002"

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Write for Bulletin H describing the Micro-Drill Press and listing collet sizes. Louis Levin & Son, Inc., 782 E. Pico Blvd., Los Angeles 21, California.

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Over the years we've made a lot of old customers out of new customers simply by giving each customer exactly the right kind of gear for his job. These customers continually express their confidence by letting us assume complete responsibility for their gear problems.

This situation pays dividends all around. It enables customers to save time and money, and it gives us considerable repeat business.

We'll enjoy your confidence, too, and you'll benefit in the bargain! THE EARLE GEAR & MACHINE COMPANY, 4707 Stenton Ave., Philadelphia 44, Pa.

It's good business to do business with EARLE!

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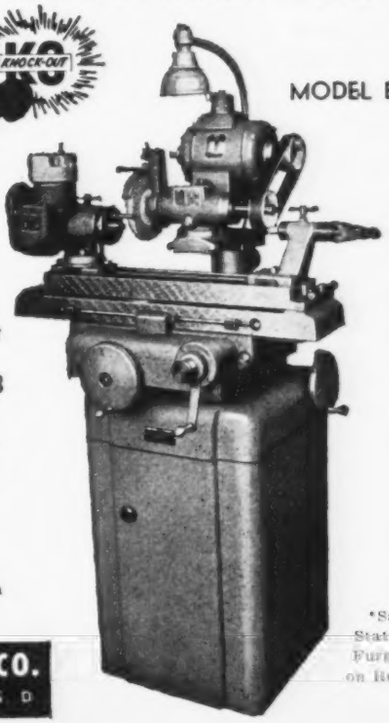
MODEL B860



Will do anything that machines costing 2 or 3 times more will do . . . yes and in less time.

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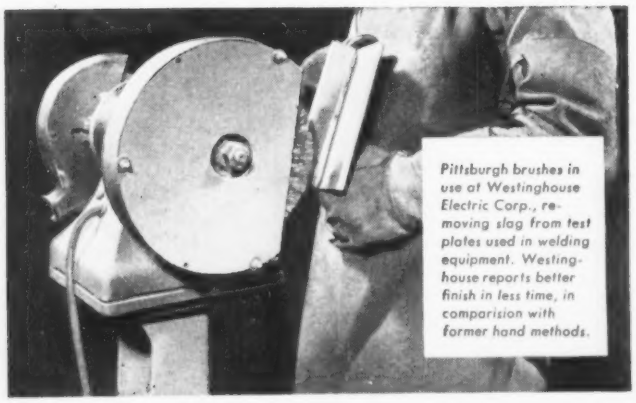
ABERDEEN, S. D.

*Sales Statistics Furnished on Request



Pittsburgh brushes in use at Westinghouse Electric Corp., removing slag from test plates used in welding equipment. Westinghouse reports better finish in less time, in comparision with former hand methods.

Replace hand finishing with power-driven Pittsburgh Brushes for

Better Cleaning
Lower Labor Costs
Fewer Rejects

—as these companies did:

Removal of imbedded slag in welding test plates formerly was done by hand at the Westinghouse Electric Corp., Trafford, Pa., using a wire brush and welder's hammer. Pittsburgh brushes, powered by a direct-drive ½ h.p. motor, now remove more slag in less time, and produce a better finish. In addition, Westinghouse reports their Pittsburgh brushes "stand up better than average in use."

Complete cleaning of dried concrete, rust and scale from steel frames used in concrete forming is essential prior to re-using the forms. Pittsburgh wire brushes were installed at the Universal Form Clamp Co., Chicago. Working on a conveyor-fed machine, the Pittsburgh brushes now remove all foreign material at a rate of 50 pieces per hour, replacing former laborious hand brushing and scraping.

De-scaling preheated bar stock at the Dominion Forge & Stamping Co., Ltd., Canada, was formerly done by hand scraping. This never did a complete job, and inclusions resulted which produced defective forgings. Pittsburgh brushes, on specially-designed machines, now do the job, and have "increased efficiency, decreased the amount of scrap, improved work quality, and saved labor."

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Write today for a free copy of our booklet that shows, through actual case histories, how Pittsburgh cuts brushing costs. Address: PITTSBURGH PLATE GLASS COMPANY, *Brush Div.*, Dept. W-10, 3221 Frederick Avenue, Baltimore 29, Maryland.

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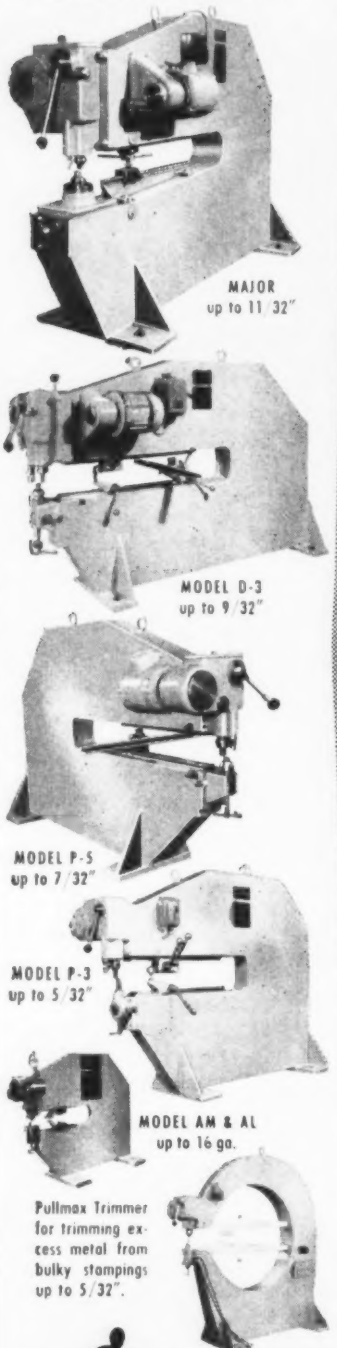
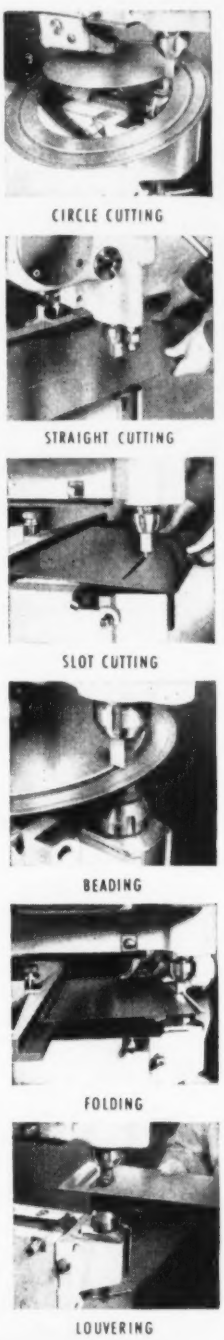


DO ALL OF THESE OPERATIONS



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FIRST — Unlike maintenance paints, Bitumastic Protective Coatings are specially formulated from a coal-tar pitch base* that is, for all practical purposes, impervious to water. And when you keep moisture away from an exposed surface, you *stop* corrosion.

SECOND — Bitumastic Coatings provide an extra-tough, extra-thick barrier against corrosive elements — a barrier that is impenetrable.

THIRD — Bitumastic Coatings provide up to 8 times the film thickness of conventional paint coatings.

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Please send me, without charge or obligation, your booklets on corrosion prevention.

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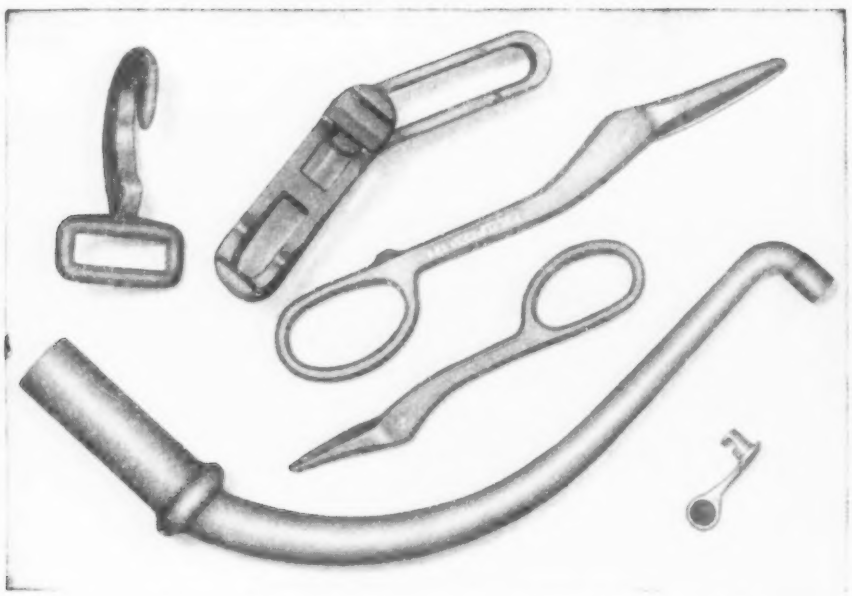

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For maximum strength and accuracy of metal parts, Ritco Bright Finish Drop Forgings are outstanding. Smooth and free of flash, they are produced in steel or non-ferrous metals, in weights from ¼ lb. to 15 lbs. It pays to remember Ritco for drop forgings, special fasteners, and regular and heavy head finished body bolts . . . also for machining and grinding.

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Handle ONE part instead of TWO or THREE

Low-cost, one-piece Washer Type PALNUT Locknuts do the job of an ordinary nut, lockwasher and plain washer combined. You save parts and handling operations—get speedy, assembly with hand or power drivers. PALNUT double-locking spring action holds tight under vibration. Built-in washer spans holes and slots. Wide range of standard sizes. Send details of assembly for free samples and literature.

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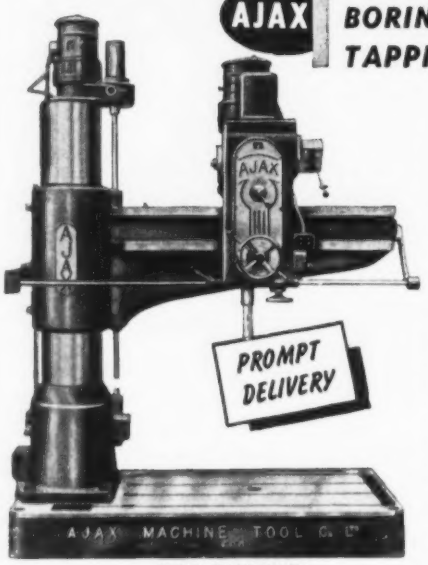

. . . Featuring internal pillar with full length sleeve to eliminate end lift of arm. Extreme rigidity is assured with easy and positive locking arrangement! 3" diameter drilling capacity in cast iron.

The Ajax Radial Drill meets all the demands of the best high speed steel and carbide tipped tools. High quality materials and workmanship together with the utmost ease of handling the centralized controls guarantee a long and trouble-free life.

Write today for full specifications.

PARTIAL SPECIFICATIONS

Max. radius of spindle from ctr. of col.	5'0"
Saddle traverse along arm	3'2"
Baseplate:	
Length of working surface	4'9"
Width of working surface	3'0"
Height of working surface	9"
#4 Morse taper:	
Spindle speeds (8)	60 to 1114 rpm

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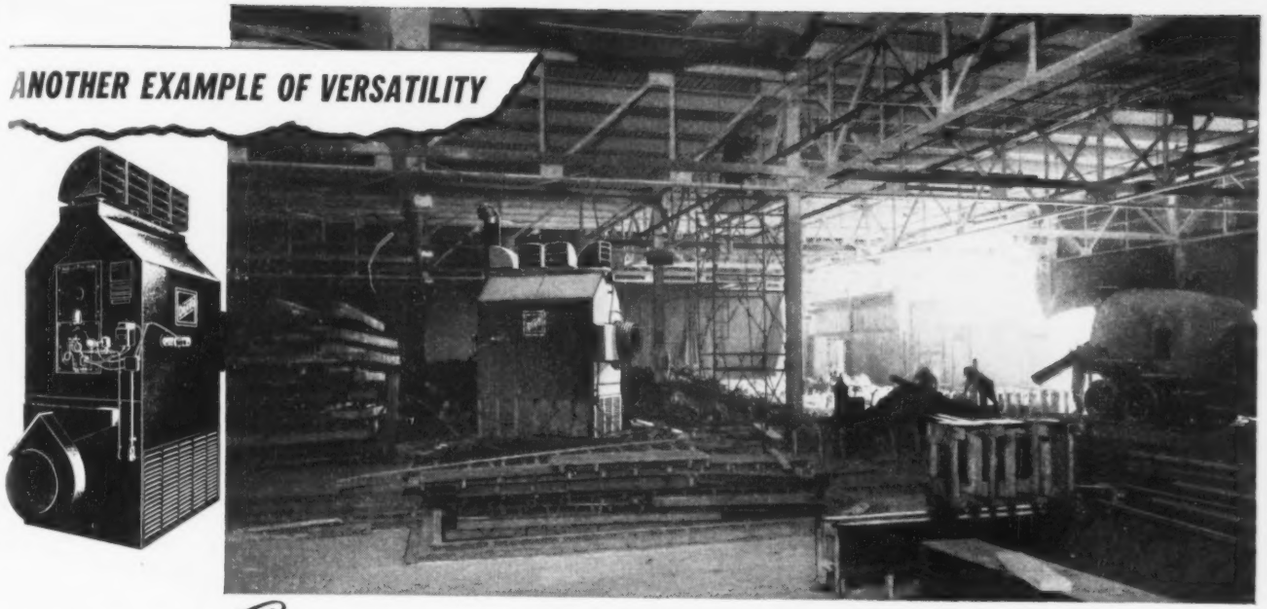
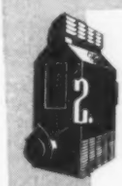


DRAVO *Counterflo* HEATERS DO DOUBLE-DUTY FOR FORD MOTOR COMPANY CONSTRUCTION PROJECT

Construction of the new Ford Motor Company Engine Plant in Cleveland called for temporary heating during the winter months of 1950-51 so the building schedule could be maintained. Six Dravo Heaters were installed to serve a two-fold purpose:

COMFORT HEATING—The Dravo Heaters maintained a 40° F. temperature inside a 405,000 sq. ft. area when outside temperatures were 0° F. . . . operated 24 hours per day . . . distributed and recirculated heat throughout the working area with a maximum air throw . . . eliminated the need for salamanders or bonfires to keep workers warm, thereby reducing fire hazards.



PROCESS CURING OF CONCRETE—The Dravo Heaters kept the ground from freezing so concrete could be poured during sub-freezing weather. Heaters helped cure concrete quickly . . . were easily moved to any location to fit job requirements.

DRAVO HEATERS OFFER YOU . . .

LOW INITIAL COST—users report 30% to 60% savings.

EASY INSTALLATION—fuel, electrical and exhaust connections are only requirements . . . no duct work.

LOW FUEL CONSUMPTION—burns gas or oil . . . readily converted . . . direct-fired.

QUICK HEAT—fast warm up . . . heat starts when heater is turned on.

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AUTOMATIC CONTROLS—on-off or modulating controls.

MOBILITY—can easily be moved to any location to suit requirements.

FLEXIBILITY—can be mounted horizontally or vertically on ceiling, walls or floor.

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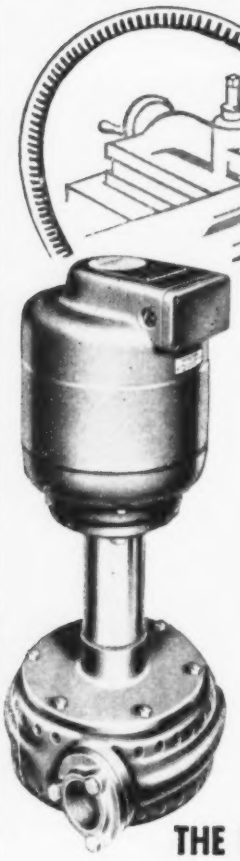

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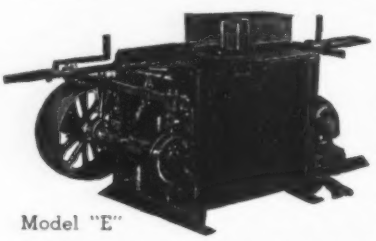

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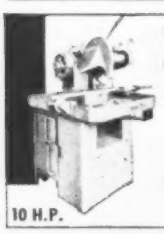

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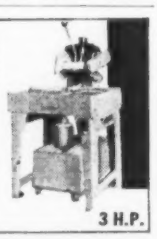

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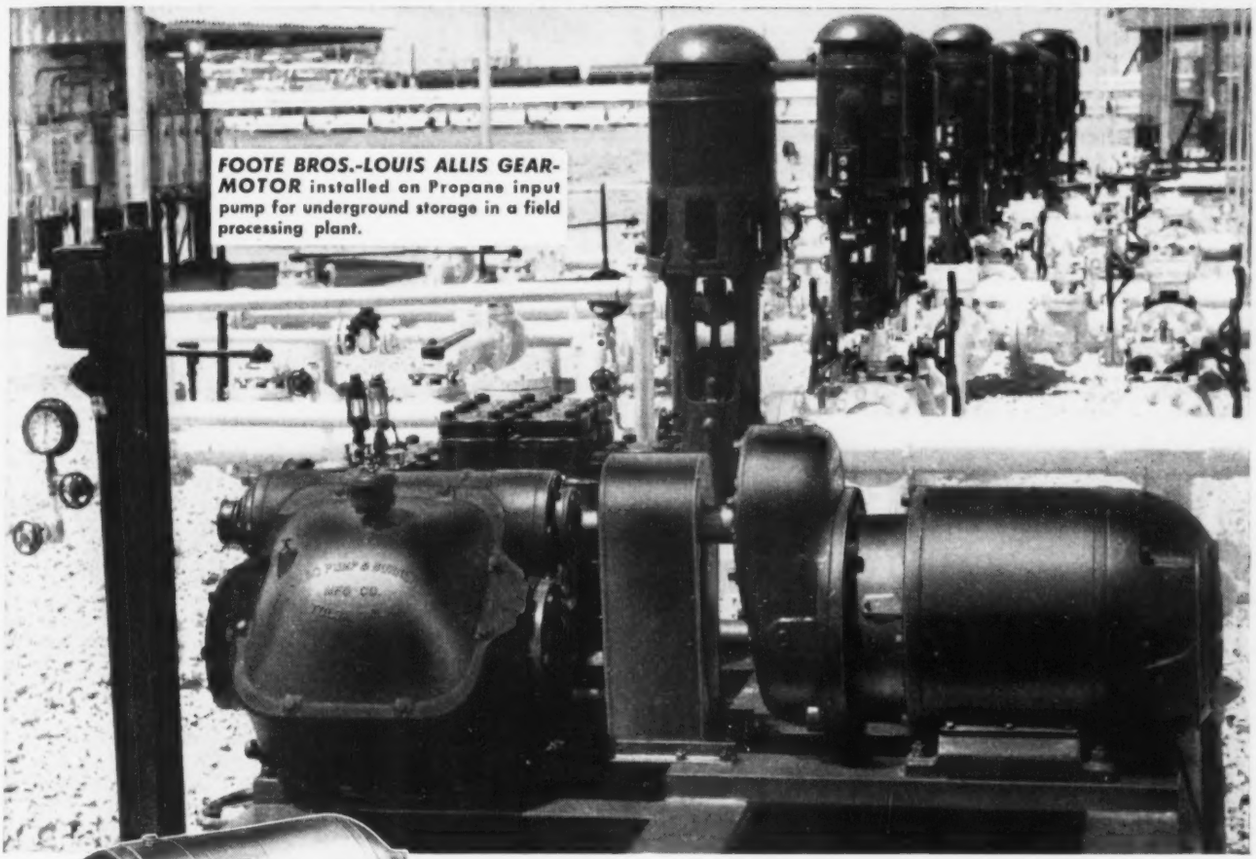
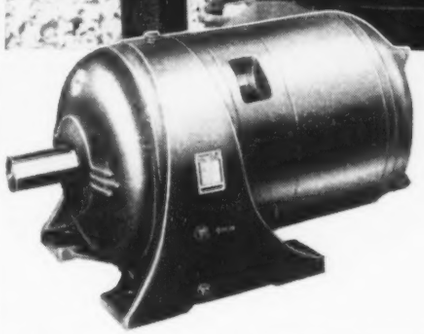


FOOTE BROS.-LOUIS ALLIS GEARMOTOR installed on Propane input pump for underground storage in a field processing plant.



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Out in the oil fields, there's no time to "baby" equipment. Quality counts and quality must be coupled with the rugged, sturdy ability to stand up under day-in and day-out service.

It is on jobs like these that the inherent stamina — the high quality — of Foote Bros.-Louis Allis Gearmotors prove themselves.

Compact in design, quality built throughout, these gearmotors incorporate Duti-Rated Gears with file-hard surfaces and resilient cores. The cast iron housings give rigidity, and the large oil reservoir with splash lubrication means continuous trouble-free operation.

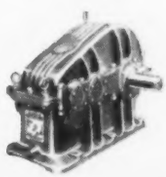
Foote Bros.-Louis Allis Gearmotors are available in single, double, and triple reductions, to provide output speeds of 780 down to 7.5 r.p.m. and capacities from 1 h.p. through 150 h.p. Open drip-proof, splash-proof, enclosed and explosion-proof motor enclosures are available.

FOOTE BROS.

Better Power Transmission Through Better Gears

LINE-O-POWER DRIVES

HYGRADE DRIVES



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Company.....

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Position.....

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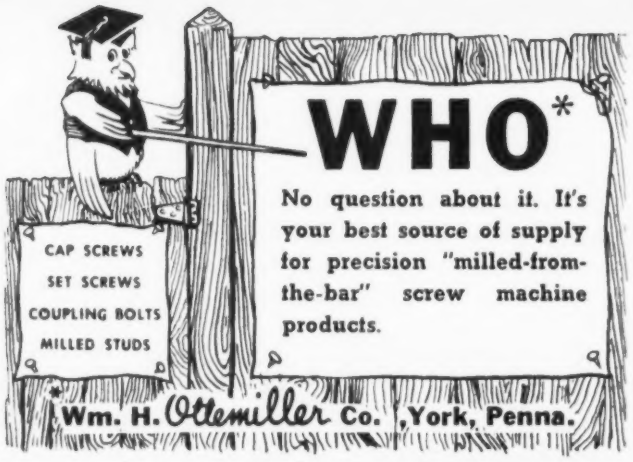
WHO*
No question about it. It's your best source of supply for precision "milled-from-the-bar" screw machine products.
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SET SCREWS
COUPLING BOLTS
MILLED STUDS
Wm. H. Ottemiller Co. York, Penna.

Gears, Chain and Pulleys
8000 Stock Items

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PRECISION BUILT
GEARS
¼" TO 72" IN DIAMETER
CUTTING ONLY OR COMPLETE GEARS

Vertical boring mills to 80", Lucas boring mills to 3¾", Planers to 4' and 12', Radial drills to 6', Lathes to 52" and Grinder 10" D x 144" long.

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Welded Fabrications
Wood and Metal
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Job and production machining, including lathes, turret lathes, screw machines, mills, grinders, all types; broaching and gear equipment.

OVER 400 MACHINES TO SERVE YOU

Ask for our equipment list and complete catalogue of over 8000 stock items —gears, chain, splines, and sprockets.

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Punches. Dies. Chisels. Rivet Sets
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GRIFFIN MANUFACTURING CO. • ERIE, PA.

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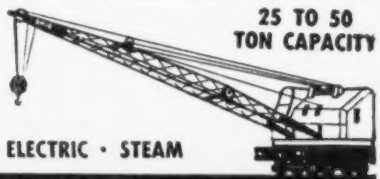

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the BIG NAME in DRILLING MACHINES
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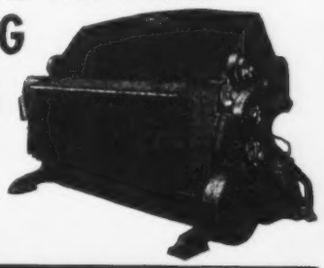
BENDING BRAKES



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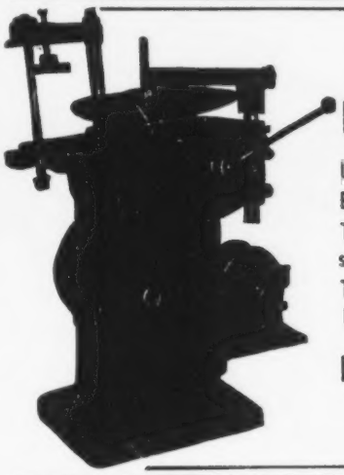

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Low in Cost. Durable.
Easy to operate.
Table adjustable for straight or taper keyways.
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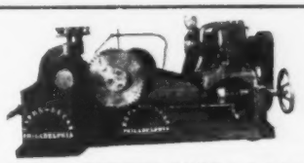


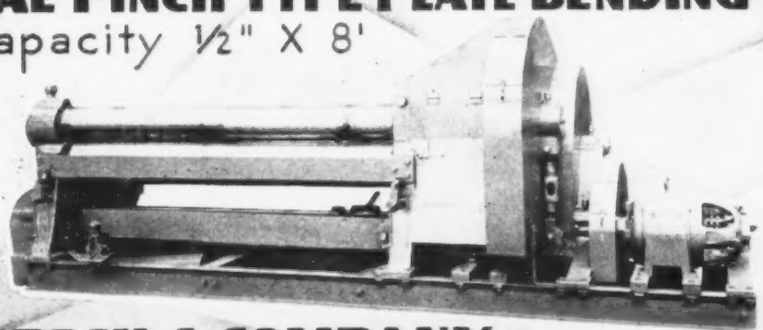
Cutting Off Machines for Sawing All Kinds of Metals

THE ESPEN-LUCAS MACHINE WORKS

FRONT AND GIRARD AVE., PHILADELPHIA, PENNA.

INITIAL PINCH TYPE PLATE BENDING ROLL

Capacity ½" X 8'



Our Line

Light and heavy machinery for all classes of sheet metal, plate and structural work

BERTSCH & COMPANY, CAMBRIDGE CITY · INDIANA

CONSIDER GOOD USED EQUIPMENT FIRST

BELT GRINDING UNIT
Hill Clutch & Machine & Fdry. Co. Open Side Abrasive Belt Grinding Unit. Designed to accommodate slabs up to ¾" thick x 30" wide x 30' long.

BRAKE—LEAF TYPE
16' x ¾" Dreis & Krump Leaf Type Bending Brake, Motor Driven with 40 H.P. A.C. Motor.

CHARGING MACHINE
6000 lb. Brosius Floor Type Gasoline Driven Charging Machine. Equipped with Peel, Gasoline Engine, Rubber Tires.

CRANE—GANTRY
5 ton Whiting Two Leg Gantry Crane 52 Ft. Span Cab Control. Three Motors 220 v. 3 ph. 60 cy.

CRANE—LADLE
75 ton Morgan Ladle Crane 49'6" Span 4-Girder, With 25 Ton Auxiliary, Complete with 230 Volt D.C. Motors.

FLANGING MACHINE
¾" McCabe Pneumatic Flanging Machine, Pneumatic Holddowns, Circle Flanging Attachment.

FORGING MACHINE
5" Ajax Forging Machine or Upsetter, Motor driven. Equipped with Air Clutch.

FURNACES—MELTING
400 lb. Moore Type "UT" Melting Furnace Top Charge. Complete with Transformer. New 1943—Little Used.
15 ton Heroult Model V-12 Electric Melting Furnace Top Charge hydraulically operated. Complete with Transformer Equipment.
25 ton Moore Size "NT" Melting Furnace, with 7500 KVA Transformer 13,200 vo. 3 ph. 60 cy.

HAMMER—COUNTER BLOW TYPE
35 ton Counter Blow Drop Forge Hammer Steam or Air Operated.

LEVELER—ROLLER
60" Aetna-Standard Roller Leveler, Motor Driven. 17 Rolls 4⅜" dia.

PLATING MACHINE
Type "B" Crown Full Automatic, Nickel & Chrome Plating Machine, Max. Work Size 16" wide x 36" deep x 4" thick.

PRESS—BRIQUETTING
Model BL-350 Milwaukee Hydraulic Briquetting Press, Complete with Pumps. Capacity Grey Iron Briquettes 3½ tons per hr.

PRESS—KNUCKLE JOINT
1000 ton Bliss #27 Knuckle Joint, Embossing & Coining Press, 2½" stroke, 18" Shut Height.

PRESSES—TRIMMING
1500 ton Hydraulic Bending & Trimming Press, Distance between columns 86" x 86".
2500 ton Hydraulic Bending & Trimming Press, Distance between columns 90" x 108".

ROLLING MILLS
8" x 10" Schmitz Single Stand Two High With Friction Drive Rewinder.
12½" x 16" Philadelphia Two High Cold Rolling Mill. Complete with Pinion Stand, 75 H.P. Motor 440/3/60. Starter and Controls, Incl. Coiler.
18" x 24" Waterbury Farrel Two Stand Two High Rolling Mill. Complete with Elec. Equip.
18" x 60" Three High Roughing Mill, Complete with billet heating furnace and accessory equipment including electrical equipment.
27" x 56" United Two High Skin Pass Mill.

STRAIGHTENERS
No. 3 Medart 3-Roll Straightening Machine Capacity 1" to 3½" Bars or 4½" O. D. Pipe or Tubing. NEW 1950.
No. 1B Sutton Round Straightener, Motor Drive, Capacity 3/16" to ¾" O.D. Friction Drive complete with 1/3 H.P. A.C. Motor.

TESTING MACHINE
20,000 lb. Southwark-Emery Universal Hydraulic Testing Machine.
300,000 lb. SOUTHWARK-EMERY Universal Hydraulic Testing Machine.

UNIVERSAL IRONWORKER
No. 28U-30 Buffalo Armor Plate Universal Ironworker — Combination Punch, Shear & Bar Cutter. Motor Driven Capacities — Shear 3" Round, 2⅝" Square, 5x1⅝" Flat, 5x5x⅝" Angles 12"—31½# Beams, etc., Punch 1½" thru 1¼".

RITTERBUSH & COMPANY, INC.
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The Clearing House

NEWS OF USED, REBUILT AND SURPLUS MACHINERY

Steady Market—Major source of used machinery demand in the Detroit area comes from the mushrooming tool and die industry. Informed guesses place the number of new tool and die shops that have sprung up around the Motor City in the past year at about 100.

Result has been a steady market for specialized tools. Strongest demand is for tool room lathes, drills, shapers and jig borers. Small new shops are particularly interested in used tools as most of them haven't been able to get priorities for new equipment and they don't have enough machine tools on hand to take care of their customers' orders.

Holding Well—In general, dealers are experiencing fairly good business volume. Pessimists continue to complain about the shortage of late model equipment, but trade is nevertheless holding up fairly well despite the wailing.

Sales of foreign tools are still filling some of the gaps dealers would prefer to plug with domestic machine tools. And few dealers intend to stick with their foreign lines when the availability of used U. S. machinery improves, as it eventually must.

One indication that the Detroit market can't be too bad is the fact that many dealers are expanding their offices or moving to more desirable locations. An example is the Montgomery Engineering Co. which is moving Nov. 15 from 1410 Prairie Ave. to larger quarters at 8500 Twelfth St.

Coast Report — On the West Coast, Seattle dealers report it is increasingly difficult to obtain enough up-to-date equipment to satisfy the strong customer demand.

Aggravating the situation is the high cost of labor. Since this item is a key factor in most manufacturing budgets, most customers are interested only in machines that will turn out the largest amount of goods in the least possible time. As a result some dealers claim they have been forced to convert some of their older equipment into scrap.

One dealer says he's stuck with an old 1500-ton shears. Customers aren't interested in it because newer machines weigh less, are more versatile and can do the job in about one-third the time required by older units. "It's the manhour figure that licks this machine," he states. "It's headed for the scrap heap."

Barren Ground—In pursuit of more modern equipment, Seattle dealers have been sending their men farther afield. To date, however, they have found that the farther they go from home the older the machinery is. And freight rates make it almost prohibitive to ship the equipment they must have a chance to sell.

Seattle dealers report Alaska has been exhausted as a used machinery source. Most of the equipment available in the North is little better than junk and not worth the expense of the long haul down.

Supply Source — But used machinery men are becoming more optimistic about their chances of solving the rankling problem of finding late model machinery so much in demand. New machine tool builders are catching up with their orders at a fast rate. A year ago overall industry backlogs averaged 23 months. The level now is around 12 months, and some industry spokesmen predict competition will be in full bloom by mid-1953 (THE IRON AGE, Oct. 30, p. 61).

With new machine tools in easier supply, manufacturers are expected to release their firm grip on tools now being used in production. And though the coming era of a competitive new machine tool market may cut off some of the demand currently being filled by used equipment, dealers are confident that they will always have their traditional markets.

CONSIDER GOOD USED EQUIPMENT FIRST

AIR COMPRESSORS
14" x 12" Pennsylvania Air Compressor, 100# Pressure, Complete with 75 H.P. Syn. Motor
18" & 11" x 14" Sullivan WJ-3 Air Compressor 885 CFM, Driven by 150 H.P. Westinghouse Syn. Motor 440/3/60

BAR TURNING MACHINE
Medart HF-2 Bar Turning Machine, Capacity 1" to 2¼", Complete with Accessories

BENDING ROLLS
6' x ¾" Ryerson Pyramid Type Bending Roll
16'x1¼" Hilles & Jones Pyramid Type Bending Roll
20' x 1" Southwark Pyramid Type Bending Roll
10' x 1" Southwark Pyramid Type, Motor Driven

BRAKES—LEAF TYPE
8' x ¼" Dreis & Krump Leaf Type Bending Brake Motor Driven with 5 H.P. A.C. Motor
12" x 3/16" Chicago #226 Steel Apron Brake, M.D.
16' x ⅜" Dreis & Krump Leaf Type Bending Brake, Motor Dr. with 40 H.P. A.C. Motor

BRAKES—PRESS TYPE
14' All Steel Hydraulic Press Brake 500 Ton Capacity, ¾"
10' x 3/16" Dreis & Krump Press Brake, Complete with Electrical Equipment

CHARGING MACHINE
6000 lb. Brosius Floor Type Gasoline Driven Charging Machine, Equipped with Peal, Buda Gasoline Engine. Rubber Tires

CRANES—GANTRY
5 ton Whiting Two Leg Gantry Crane 52' Span Cab Control Motors 220 v. 3 ph. 60 cy.
15 ton P&H Two Leg Gantry Crane 45' Span With 13' Overhand one end 10' other end 5 ton Auxiliary, Two Trolleys and 8 Motors 440 volt 3 phase 60 cycle

CRANE—LADLE
75 ton Morgan Ladle Crane 49'6" Span 4-Girder Construction, with 25 Ton Auxiliary, Complete with Motors for 230 Volt D.C.

CRANES—OVERHEAD ELECTRIC TRAVELING

5 ton Robbins Myers	28'6" Span 220/3/60
10 ton Shaw	67' Span 230 Volt D.C.
10 ton P & H	77' Span 230 Volt D.C. Equipt with 2 hooks spaced 11' apart
10 ton P & H	40' Span 440/3/60 AC
10 ton Erie	60' Span 440/3/60 AC
15 ton Niles	60' Span 230 Volt D.C.
20 ton Bedford	50' Span 220/3/60 AC
20 ton Morgan	68' Span 230 Volt DC With 5 ton Auxiliary

DIEING MACHINES
75 ton Henry & Wright High Speed Dieing Machine Double Roll Feed, Scrap Cutter, 3" Stroke
100 ton Henry & Wright Dieing Machine, 4" Stroke. 13" Shut Height. Complete Elect. Equip.

DIE CASTING MACHINE
Model BA-12 KUX Die Casting Machine, Air operated. Plunger Gooseneck Type for zinc, lead and tin. Die space between bars 12¼" x 12¼". Die Separates 8" NEW 1949, never used

DRAW BENCH
50,000 lb. Draw Bench, Motor Driven with 50 H.P. Motor. Maximum Draw 40 ft.

FLANGING MACHINE
¾" McCabe Pneumatic Flanging Machine, Pneumatic Molddowns, Circle Flanging Attachment

FORGING MACHINES
1½", 2", 3", 4", 5", 6" Ajax
1", 2", 3", 5", Acme
5 Ajax—Air Clutch

FURNACE—ANNEALING
Furnace Engr. Co. Bell Type Annealing Furnace Gas Fired, Operating Space 40"x40" Round, 500 CFM Capacity.

FURNACE—HEATING
60 KW Leeds & Northrup Homo Furnace #9478-UB-28, With controls, Work space 28" dia. x 28" deep

FURNACES—MELTING
400 lb. Moore Type "UT" Melting Furnace. Top Charge. Complete with Transformer. New 1943—Little Used
6000 lb. R.I.S. Nose Tilting Furnace. Complete with Transformer Equipment
15 ton Heroult Model V-12 Top Charge Hydraulically Operated. Complete with Transformer Equip.

GEAR REDUCERS
500 H.P. United Combination Reduction Gear & Pinion Stand, Gear Ratio 8.581:1
600 H.P. Farrel Birmingham, Size 18 Reduction Gear, Ratio 730 to 244 RPM
700 H.P. Falk Single Reduction Gear, Ratio 375 to 300 RPM
1200 H.P. Mesta Gear Reduction Unit, Ratio 19:1

GRINDER
No. 4 Cincinnati Centerless Grinder, Motor Driven. Capacity standard work rest 2" to 6" dia., optional work rest ⅛" to 3". Special fixtures will allow work to be handled up to 9" dia.

GRINDER—CYLINDRICAL
14 x 36" Norton Type C. Complete with Elect. Equip.

HAMMERS—BOARD DROP
1200, 1600, 4000 lb. Model J2 Chambersburg
1000 lb. Billings & Spencer

HAMMER—COUNTER BLOW TYPE
35 ton Counter Blow Drop Forge Hammer. Steam or Air Operated

HAMMER—STEAM DROP
1500 lb. Erie

HAMMERS—STEAM FORGING
1200 lb. Massilion Single Frame
1500, 1600, 2000, 3000, 4000 lb. Chambersburg
800, 1500, 2500 lb. N.B.P.
800, 1100, 1500, 2000, 2500, 3500, 4000 Erie

HAMMERS—MISCELLANEOUS
No. 6N Nazel Hammer, Geared Motor Drive
200 lb. Bradley Compact Hammer, Arr. for Motor Drive with 10 H.P. A.C. Motor
2000 lb. Chambersburg Pneumatic Hammer Complete with Elect. Equip. New 1951
15"x12" Chambersburg Ceeostamp Hammer, 18" stroke

LATHE—TURRET
Model 2L Gisholt Geared Head Turret Lathe, Spindle Bore 4-1/16". Elect. Equipment and numerous accessories incl. NEW 1951

LEVELER—ROLLER
60" Aetna Standard 17-Roll Leveler, 4⅝", Dia. Rolls Arr. Motor Drive

MOTORS
1250 H.P. Westinghouse Induction Motor 6600 volt 3 phase 60 cycle 593 R.P.M.
2000 H.P. General Elec. Induction Motor 6600 volt 3 phase 60 cycle 600 R.P.M.
2500 H.P. General Elec. Direct Current Motor 6600 volt 175/350 R.P.M.

MOTOR GENERATOR SET
740 H.P. General Electric Syn. Motor 4400 volt A.C. with two generators 750 KVA 230 volt D.C., Complete with Panel Board, etc.

NAIL MAKING MACHINES
No. 1½ National—Sizes 10D, 12D, 16D, 20D, 30D
No. 3 National—Size 6D
No. 2 Glader—Sizes 6D, 7D, 8D, 9D
Angell—Sizes 10D, 12D, 16D, roofing

PRESSES—EXTRUSION
700 ton Horizontal Extrusion Press, 3-Column Type Ram 26" Diameter, Container suitable for billets 5" x 20"
1200 ton Horizontal Extrusion Press, 3-Column Type Ram 34" Diameter, Suitable for billets 6" dia. x 22" long

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CONSULTANTS IN MANUFACTURING PROBLEMS FOR OVER A QUARTER OF A CENTURY

THERE IS NO SUBSTITUTE FOR EXPERIENCE

CONTACT US IN CONFIDENCE WITHOUT COST OR OBLIGATION

PRESSES—HYDRAULIC
Model BL-350 Milwaukee Hydraulic Briquetting Press Complete with Pumps. Capacity Grey Iron Briquettes 3½ tons per hr.
75 ton Williams White Straightening Press 27" Stroke, Bed 8' x 16", 6½" Dia. Ram
200 ton Bliss Hydrodynamic 48" Stroke Bed Area 24" x 24", Hyd. Pump Incl.
500 ton Southwark Hydraulic 24" Stroke, 78" Daylight Platen 64" R to L x 32" F to B
500 ton Southwark Open Throat Hydraulic Press 13" Stroke Platen 56" x 56"
700 ton Elmes Forming Press, 27" Stroke, 30" Dia. Ram, Platen 40" x 88" with overhang 40" x 129". Complete with Pump and Motor

PRESS—HYDRAULIC WHEEL
100 ton Elmes Inclined Hydr. Wheel Press 72" Between Parallel Bars. Complete with Pump & Motor

PRESS—KNUCKLE JOINT
#37 Bliss Knuckle Joint Embossing & Coining Press 1000 ton Capacity, 2½" Stroke, 13" Shut Height

PRESSES—STRAIGHT SIDE
No. 305 Bliss 9" Stroke 14" Shut Height Equipped with Marquette Air Cushion
No. 59 Toledo Double Geared Tie Rod Press 255 ton Friction Clutch 18" Stroke 36¼" x 85" Bed Area
No. 3 Ferracute Super Speed Punch Press 30 ton Capacity, NEW 1946—never used
No. 820 Bliss High Production Press, 1¼" Stroke SI-40 Verson 200 ton Press, 30" Stroke Bed Area 40" x 44"
No. 12 Zeh & Hahnemann Patent Percussion Press 150 ton 12" Stroke, 17" x 17" Bed Area
No. 1037-⅝ Hamilton 300 Ton 16" Stroke Bed Area 48" x 104"

PRESS—TOGGLE DRAWING
No. 410A Bliss 650 Ton Double Crank Strokes 25" & 17" Bed Area 60" x 84"

PRESSES—TRIMMING
Bliss S.S. Trimming Press with Side Shear, 250 Ton Capacity, 8" Stroke 52" x 30" Bed Area
No. 3 Erie Flywheel Drive Trimming Press, 3¼" Stroke 13" Between Guides
1500 ton Hydraulic Bending & Trimming Press. Distance between columns 86" x 86"
2500 ton Hydraulic Bending & Trimming Press. Distance between columns 90" x 108"

PUNCH—BEAM
Long & Allstatter Double End Beam Punch, Capacity Beam Punch End—Punch flanges and web 36" I-beam and smaller

PUNCH & SHEAR COMBINATIONS
No. 28 U-30 Buffalo Armor Plate Universal Ironworker. Capacity Punch 1⅛" thru 1¼", Shear 3" Round 3⅝" Square, 5 x 1¾" Flat, 5 x 5⅛" Angles
Style EF Cleveland Single End Punch & Shear, M.D. Capacity Punch 1" thru 1¼"

RIVETER
125 ton Hanna Bull Riveter, Air Driven, 24" Gap, 75" Reach. Capacity 1" rivets cold and 1⅛" rivets hot

ROLL—PLATE STRAIGHTENING
7 Roll Bertsch Plate Straightening Machine, Capacity 10' x ¾". Complete Elect. Equip.

ROLLING MILLS
7½" Steckel Four High Rolling Mill, Max. Steel Width 6". Work Rolls 2⅛" x 7½". Complete with electrical equipment
8"x10" Schmitz Single Stand Two High
12"x16" Single Stand Two High, Comp. with Elect. Equip.
12"x24" Waterbury Farrel Two High
15"x30" Mossberg Single Stand Two High
18"x24" Waterbury Farrel Two Stand Two High
20"x30" Two Stand Two High Rolling Mill
20"x36" Poole Two Stand Two High
22"x40" Single Stand Two High
27"x56" United Two High Skin-pass Mill
28"x60" Single Stand Two High
18"x60" Three High Roughing Mill, Complete with billet heating furnace and accessory equipment incl. elect. equip.

ROLL—TAPER FORGING
No. 00 Williams White Taper Forging Roll. Rolls 24" Dia., Shaft 8" Dia.

SAWS
No. 3 Ryerson Friction Saw, 54" Blade Hydraulic Feed, Complete with Elect. Equip.
52" Ryerson Friction Saw, 45 H.P. Motor, Capacity Approx. 9" Round, 30" I-beam, 12" H-beam

SHEAR—ALLIGATOR
No. 7 Thomas Carlin Alligator Shear, 16" Blade 30 H.P., D.C. Motor

SHEARS—ANGLE
Hilles & Jones No. 2 Double Angle Shear, M.D. Capacity 6" x 6" x ⅝"
Long & Allstatter Double Angle Shear, Model B Capacity 6x6x⅝". Complete with Elect. Equip.

SHEAR—BAR
No. LH Lewis Open End Bar Shear, Motor Drive. Capacity 1⅛" Round

SHEARS—ROTARY
No. 60 Quickwork Rotary Shear, ⅜" Capacity
No. 100 Kling Rotary Shear, 1" Capacity
No. 30 Quickwork Rotary Shear 5/16" Capacity
Quickwork Heavy Duty Circle Shear ⅝" Capacity. Complete with Circle Cutting Attachment
No. 25A Quickwork Whiting Rotary Shear ¼" Capacity, with Circle Cutting Attachment, Motor Driven

SHEARS—SQUARING
12'x3/16" Stameo Steel Squaring Shear, Motor Dr.
8' x ¼" Drabert Model THZ 6/2500
6' x ¼" Long & Allstatter, Belted Motor Drive

SLITTERS
24" Torrington Heavy Duty Slitter, Capacity 5 cuts ⅛" mild steel
31" Yoder Sheet Slitter No. 530, Capacity 3 cuts .194" to 8 Cuts .156", Motor Dr.
72" Yoder Gang Slitter, Capacity 5 Cuts 20 Ga.

STRAIGHTENERS
No. 0 Medart Round Straightener. Capacity ⅝"—1⅛" bars, 2" tubing. NEW 1952
No. 3 Medart 3-Roll Straightening Machine Capacity 1" to 3½" bars or 4½" O.D. Pipe or Tubing. NEW 1950
No. 1½B Sutton Round Straightener, Motor Dr. Capacity Tubing 5/16" to 2⅛"—modified to handle up to 3½" O.D. tubing
No. 1B Sutton Round Straightener, Motor Drive Capacity 3/16" to ⅝" O.D. Friction Drive complete with 1/3 H.P. A.C. Motor
Halldén 8-Roll Strip Straightener & Cutting Machine, Capacity 14" wide 11 Ga. Sheet Steel

STRETCHER
McKay Hydraulic Bar Stretcher. Capacity up to 1¾" dia. in length 12' to 27'

SWAGING MACHINES
No. E4 Langelier, Capacity 1¼" Tubing
No. 408 Elna Swager, Capacity 4" Tubing

TESTING MACHINES
300,000# Southwark Emery Universal Hydraulic
20,000 lb. Southwark Emery Universal Hydraulic

WELDERS
250 KVA Progressive Model A-6 Flash Welder 440 volt 60 cycle. Mechanical Contactor Hi-Pressure Clamp Assembly—NEW 1949
40,000# Ransome Welding Positioner. Rectangular Table 84" x 84" x 1¾"
McKay Tube or Pipe Welding Unit, Capacity 4¾" to 7½" O.D. Complete with all accessory equipment and motors

WIRE DRAWING MACHINE
No. 0 Waterbury Farrel 7-Die Wire Drawing Machine. Capacity ¼" rod to #10 copper

• Manufacturing **RITTERBUSH & COMPANY, INC.** Equipment •

50 CHURCH ST., NEW YORK CITY 8

Telephone Cortlandt 7-3437

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Liquidations — Bona Fide Auction Sales Arranged

Consulting Engineering Service
Surplus Mfg. Equipment Inventories Purchased

THE CLEARING HOUSE

RE-NU-BILT GUARANTEED ELECTRIC POWER EQUIPMENT

D.C. MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	2200	G.E.	MCF	600	400/500
1	1750	Whse.		600	550/700
1	1500	Whse.		525	600
1	940	Whse.	QM	230	140/170
1	600	Al. Ch.		250	400/800
1	500	Whse.	CC-216	600	300/930
3	450	Whse.		550	415
1	400	G.E.	MCF	550	300/1050
1	450	Cr. Wh.	CCM-151H	230	1100
1	335	Whse.	MQ	230	300/900
1	200/300	G.E.	MPC	230	360/920
1	200	Rel.	1970T	230	720
1	150	G.E.		600	250/750
1	150	Rel.	1100T	230	400/1200
1	150	Cr. Wh.	65H	230	1150
10	150	Cr. Wh.	82H-TEFC	230	960
2	150	Whse.	SK151B	230	900/1800
1	150	Whse.	SK-201	230	360/950
1	50/120	G.E.	MCF	230	250/1000
2	100	Whse.	SK-181	230	450/1000
1	100	G.E.	CDP-115	230	1750

MILL & CRANE

1	50	G.E.	CO-1810	230	725
1	33	Whse.	K-8	230	505
2	30	G.E.	MD-101½AA	550	700
1	20	Whse.	K-5	230	975
4	15	Whse.	K-5	230	630
8	10	C.W.	SCM-AH	230	1150
1	10	G.E.	MD-104	230	400/800
8	6.25	Whse.	K-3	230	680
4	3	C.W.	SCM-FF	230	1750
3	3	Whse.	HK-2	230	935
1	2¼	Whse.	K-1	230	835

A.C. MOTORS

3 phase—60 cycle

SLIP RING

Qu.	H.P.	Make	Type	Volts	Speed
1	1800	G.E.	MT-498	2300	360
1	1500	ABB		2300	720
1	1200	G.E.	MP	2300	275
1	500	Whse.	CW	550	350
1	500	G.E.	IM	440	900
2	500	G.E.	M-574-Y	6600	900
1	500	G.E.	IP	550	505
1	400	Whse.	CW	440	514
1	350	G.E.	MT-442Y	2200/4000	253
1	300	Al. Ch.		440	505
1	250	G.E.	MT-424-Y	4000	257
1	250	G.E.	MT-5598	2200	1800
1	250	Al. Ch.		550	600
1	200	Cr. Wh.	260B	440	505
2	200	G.E.	IM17	550	585
3	200	G.E.	IM-17	440	600
1	200	G.E.	IM	440	435
1	200	G.E.	MTP	440	1170
1	150(unused)	Whse.	CW	2300	435
1	125	Al. Ch.		440	720
4	125	G.E.	MT-566Y	440/2200	435
2	100	G.E.	IM	440	600
5	100	A.C.	ANY	440	695
1	100	G.E.	IM-16	2200	435
1	100	Whse.	CW-868A	440	700

SQUIRREL CAGE

2	650	G.E.	FT-559BY	440	3570
2	450	Whse.	CS-1420	2300/4150	854
1	300	Al. Ch.		2200	385
1	200	G.E.	IK-17	440	580
1	200	G.E.	IK	440	865
3	200	G.E.	KT-557	440	1800
1	150	Whse.	CS-8568	440	880
1	150	Whse.	CS	440	580
1	150/75	G.E.	IK	440	900/450
3	125	Al. Ch.	ARW	2200	1750
1	125	G.E.	KF-6329-Z	440/2200	3585
1	125	Whse.	MS	440	485

SYNCHRONOUS

2	3500	G.E.	TS	2200	257
2	2100	G.E.	ATI	2300	360
2	1750	G.E.	ATI	2300	3600
2	2000	Whse.		2300	120
3	735	G.E.	ATI	2200/12000	600
1	450	Whse.		2200	450
2	350	G.E.	TS	2200	156

M-G Sets — 3 Ph. 60 Cy.

Qu.	K.W.	Make	RPM	D.C. Volts	A.C. Volts
2	2000	G.E.	500	660	11000*
1	2000	G.E.	514	600	6600/13200
3	1500	G.E.	514	250	6600/13200
1	1500	G.E.	720	600	6600/13200
1	1500	G.E.	360	275	4300
3	1500	G.E.	600	600	4160
2	1000	Whse.	900	600	4160
1	1000	G.E.	900	260	6600
1	1000(3U)	G.E.	900	250	2200
1	750	Whse.	900	275	4160
1	500	G.E.	720	125	2300
1	500	Whse.	900	125/250	440
1	500	Whse.	900	250	6600/13200
1	500	Whse.	1200	125/250	2300
1	400	Whse.	1200	250	2300
1	400(3U)	Cr. Wh.	1200	125/250	2300
1	350	G.E.	900	125	2300/4160
1	300	Al. Ch.	1200	125/250	2300
1	150	Whse.	1200	275	2300
1	140(3U)	Cr. Wh.	690	125/250	440/2300
1	100	Delco	1200	120/240	2300
1	100	G.E.	1170	125	220/440

* 25 Cycle

FREQUENCY CHANGER SETS

Qu.	KW	Make	Freq.	Voltages
1	3000	G.E.	25/60	2300/2300/4000
3	2500	G.E.	25/62.5	2300/2300
1	1000	G.E.	25/58.3	4400/2300
1	500	Al. Ch.	2560	11000/2300

BELYEA COMPANY, INC.

47 Howell Street, Jersey City 6, N. J.

MILES' QUALITY

AIR COMPRESSOR, 21"x13"x16" Worthington
AUTOMATIC, 20"x25" Fay (1942)
AUTOMATIC, 8" Bullard Multi-Au-Matic, 6-spindle
AUTOMATIC, 6-spindle Baird chucker
AUTOMATIC, 3¼" & 3¾" Cleveland "A"
BORING MILL, 4" Detrick & Harvey, horizontal, floor type
BROACH, No. 1 Foote Burt duplex surface
BROACH, 2-ton American horizontal hydraulic
BROACH, No. 3XA Oilgear horizontal hydraulic
BROACH, V42 American hydraulic, 18 ton
BULLDOZER, No. 22 Williams & White
DRILL, Nos. 217, 310, 321 Baker
DRILL, No. 36 HO Baker hydraulic
DRILL, 24" Cincinnati upright
DRILL, 12-spindle No. 12 Natco
DRILL, 12-spindle No. 10 Defiance rail type
DRILL, No. B 250 H Natco multiple
DRILL, 36-spindle Baush, adjustable spindle
DRILL, RADIAL, 3½', 8" American sensitive
GEAR HOBBER, No. 12H G&E
GEAR HOBBER, No. 130 Cleveland Rigidhobber
GEAR HOBBER, No. 3 Adams Farwell
GEAR HOBBERS, No. 12 & Type A Barber Colman
GEAR HOBBERS, Nos. 1 and 25 5A Lees Bradner
GEAR SHAVER, 8"-12" Red Ring
GRINDERS CENTERLESS, Two No. 2 Cincinnati,
GRINDER, 6"x30" Cincinnati, type ER, infeed
GRINDERS, 10" x 18" & 10" x 36" Norton Semi-Auto
GRINDER, DISC. 30", No. 8 Badger
GRINDER, DISC. No. 228 Hanchett opposed
GRINDER, DISC. No. 84A Gardner opposed
GRINDER, GEAR, 10" Pratt & Whitney
GRINDER, Internal, Bryant Nos. 5, 16A, 16-28 & 24-36
GRINDERS, INTERNAL, Nos. 72A3 and 72A5 Heald
GRINDERS, SURFACE, 12" and 16" No. 22 Healds
GRINDER, SURFACE, No. 78 Wilmarth & Morman
HAMMER, Nos. 5N & 6B Nazel pneumatic
HAMMER, 40 lb. Bradley helve
HONE, Nos. 172 & 2610 Barnes hydraulic
LATHE, ENGINE, 24"x14' American
LATHE, TURRET, No. 5 Acme universal
LATHE, TURRET, No. 5 Gisholt universal, 1943
LATHE, TURRET, No. 6 W&S, G, H, motor-in-base
MILLERS, Two No. 2 Cincinnati plain
MILLER, 18" Cincinnati automatic
MILLER, 24" Cincinnati automatic duplex
MILLER, type 45 Product-O-Matic
MILLER, 30½" x 21" x 12" Ingersoll 4-spindle planer type
MILLER, 48" x 20" x 20' Ingersoll planer type, 3 vertical heads
MILLER, 48" x 36" x 12' Ingersoll planer type adj. rail
MILLER, 84" Ingersoll 6-spindle rotary continuous
MILLER, PLAIN, No. 3B Milwaukee
MILLER, THREAD, Type C Hall planetary
MILLER, THREAD, Nos. 4, 6 and CT 36 Lees Bradner
NIBBLER, No. 3 Savage rotary
PLANER, 36"x36"x8' Cleveland openside
PLANER, 36"x36"x12' Niles Bement Pond
PRESSES, Nos. P01, P1, P2, P3, PA4, P5 and CA4 Ferracute
PRESS, No. 61 Cleveland OBI
PRESS, No. 6 Toledo OBI
PRESSES, Nos. 56 & 56½ Toledo
PRESS, No. 245½ Hamilton S.S. tiered frame
PRESS, No. EG54 Ferracute knuckle joint
PRESS, 600 ton No. 570 Toledo forging
PRESS, No. DA8411 Hamilton double action toggle
PRESS, 100 ton HPM hydraulic
RIVETERS, large variety
ROLL, 20"x3/16" Farnham bending
SLOTTER, 16" Bement Miles crank
SAWS, Three 816S Kalamazoo metal cutting band
SAW, 7" No. 14 Higley cold-cutting
SHAPER, 24" American auto, oiled
SHAPER, 32" Ohio Dreadnaught
SHAPER, 27" Morton draw cut
SHEAR, 38" throat No. 17F New Duty
STRAIGHTENER, No. 0 Sutton for bars
SWAGER, No. 154 Etna
TAPPERS, Two No. 71 Ettco
TAPPER, 19" Hammond sensitive drilling & tapping
TESTER, 230,000 inch-pound Tinius-Olsen No. 2 torsion
TESTER, 100,000 lb. Riehle tensile & compression
THREADERS, 2" Landis pipe threading and cutting
THREADERS, Two ¾" Landis, double spindle
THREADERS, 2" Oster rotary head
UPSETTER, 3" National air clutch
UPSETTERS, Two 4" Ajax heavy duty, twin-gear
WELDER, 100 KVA Thompson automatic spot
WELDER, 100 KVA National Flash
WELDERS, 12" and 14", 12 KVA American Electric Fusion Co. spot.

WRITE FOR CATALOG NO. 193 FOR COMPLETE LISTING

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2025 E. Genesee Ave.

SAGINAW, MICHIGAN

GUARANTEED TOOLS

16"x78" SIDNEY Toolroom Lathe, chuck, taper, new 1947

60"x20' NILES-BEMENT-POND Geared Head Engine Lathe, rapid traverse

27"x12' MONARCH Geared Head Engine Lathe, taper attachment, AC-MD

24"x72" centers BOYE & EMMES Heavy Geared Head Engine, chuck, AC-MD

No. 2B FOSTER Geared Head Turret Lathe, rapid traverse, AC motors

No. 3L GISHOLT Turret Lathe, 6¼" hole in spindle, bar feed, chuck, tooling, new 1945

42" BULLARD New Era Type Vertical Turret Lathe, AC-MD

36" BULLARD Vertical Turret Lathe converted to Spiral Drive, AC-MD

1½" LANDIS Double Head Bolt Threader, with leadscrews, MD

No. 1 DOUGLAS Plain Horizontal Mill, table 8"x32", power feeds, motor in base, No. 40 taper, new 1942

No. 2 VAN NORMAN Plain Horizontal Mill, power rapid traverse, No. 50 taper, new 1942

No. 3-24 CINCINNATI Plain Hydromatic Mill

5-13" column CARLTON Radial Drill AC motor on arm, 15 to 1500 RPM

4' AMERICAN High Speed Sensitive Radial Drill 9" column, AC motor on arm

No. 914 W. F. & John BARNES Hydraulic Drill, No. 6 Morse taper, 15HP motor, new 1948

3 Spindle FOSDICK Drill Press, Individual AC motors for each spindle, 1942

No. 6 TOLEDO O.B.I. Press, 56 Tons

Brand New Model FH-4C01 DENNISON Hydraulic Presses, 4 Ton, 8" throat (3)

10"x24" NORTON Hydraulic Surface Grinder, 1942

25A HEALD Rotary Surface Grinder, 24" diameter, magnetic chuck

36" OHIO Dreadnaught Shaper, AC-MD

75 Ton HENRY & WRIGHT Double Crank Dieing Machine, roll feed & Scrap cutter

No. 22 MURCHEY Threader

No. 135 CLEVELAND Rigidhobbers

O'CONNELL MACHINERY CO.

Tel: BAiley 5800

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IMMEDIATE DELIVERY

BLISS No. 5S Double Action Toggle Draw Press, Bed Area 38" x 33", Stroke of Blankholder 10", Stroke of Plunger 21", Air Clutch. New in 1945.

BLISS No. 88 Straight Side Single Crank Press, Capacity 255 ton, Bed Area 30" x 29", 18" Stroke of Slide, Marquette Air Cushion.

TOLEDO Double Cranks, Nos. 91-42, 92C, 93½C, 93½E.

CLEVELAND Double Cranks 65-G-72, 45-D-60.

NIAGARA Double Cranks, 67C, 68C, 612C.

BLISS No. 25K Knuckle Joint 600 Ton Capacity.

National Machinery Exchange

128 Mott St. New York, N. Y.

Canal 6-2470

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USED **AS IS** **RECONDITIONED**

STANDARD GAUGE FREIGHT CARS

Box, Double Sheathed, 50-Ton Capacity
Box, Single Sheathed, 50-Ton Capacity
Flats, 40 & 50-Ton, Steel Underframe, 40'0" long
Gondolas, Composite, 40-Ton Capacity
Gondolas, Composite or All-Steel, 50-Ton
Hoppers, Covered, All-Steel, 70-Ton
Hoppers, Twin, All-Steel, 50-Ton, Cross Dump
Hoppers, All-Steel, 70-Ton, Cross Dump
Tank, 3,000-Gallon, High Pressure
Tank, 8,000-Gallon, Coiled and Non-Coiled

EXTRA LONG FLAT CARS

40 & 50-Ton Capacity, Length 70' and 74'

CABOOSE CARS

Eight Wheel, Cupola Type

STANDARD GAUGE AIR DUMP CARS

Side Dump, 20-Yd., 40-Ton, Lift Door
End Dump, 20-Yd., 50-Ton, Drop Door
End Dump, 10-Yd., 30-Ton, Lift Door

OTHER EQUIPMENT

Locomotive Cranes
Overhead Cranes
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STANDARD GAUGE DIESEL-ELECTRIC ROAD SWITCHING LOCOMOTIVE

1500 H.P., 120-Ton, Type 0-4-4-0

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6,000 Gallon
8,000 Gallon
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LATE TYPE MACHINE TOOLS

Model RA-4 1⅜" Acme Gridley Automatic. Late Type.
HP-100 LaPointe Horizontal Hydraulic Broach. 1945.
No. 7 Gleason "Revex" Gear Rougher. 1943.
14"x168" Norton Plain Type C Grinder. 1942.
24-36 Bryant Hydraulic Internal Grinder.
No. 72A3 Heald Plain Hydraulic Internal Grinder. 1941.
27"x192" Niles "Timesaver" Engine Lathe. 1941.
27"x120" Lodge & Shipley Engine Lathe. 1940.
No. H5 Libby Universal Saddle Type Turret Lathe. 1939.
No. 3R Gisholt Universal Saddle Type Turret Lathe. 1942.
8"x84" Lo-Swing Semi-Automatic. 1941.
No. 3 Cincinnati Dial Type Vert. Mill. 1942.
No. M-18 Kearney & Trecker Simplex Mill. 1943.
3A Sundstrand Copy Mill.
650 Ton Verson Double Action Eccentric Press. 1940.

Ask for Current Stock List

INDIANAPOLIS MACHINERY & SUPPLY CO.
1983 S. Meridian St.
INDIANAPOLIS 6, IND.

SPECIALS OF THE WEEK

AUTOMATIC SCREW MACHINES

BROWN & SHARPE: (3) Model 2G, serial #8500 & 11500 series, 1¼" capacity.
BROWN & SHARPE: (10) Model OG, serial #9600 & 10700 series, ⅝" capacity
BROWN & SHARPE: (7) Model OOG, serial #14 to 16000 series, ⅜" capacity.
CECO: (2) Swiss Type. ⅜" capacity.
CLEVELAND: Model AA-11, 1⅜" serial #36586.
CLEVELAND: Model B, serial #42618/843, 1 1/16" capacity.
CONOMATIC: 4 Spindle, serial 2309FF, 1½" capacity.
CONOMATIC: 8 Spindle, serial #4391VB, 1⅝" capacity. 20 H.P. motor. Extra tooling.
NEW BRITAIN GRIDLEY: 6I, 6 Spindle, serial #25410, 1⅝" capacity.

OTHER MODERN TOOLS IN STOCK

BORING MILLS: Bullard, Giddings & Lewis, New, 3" Capacity Horizontal
DRILLS & RADIALS: New Geared 24" Drills, 2" Capacity, New Radials 3½" x 12" Column
ENGRAVERS: Auto, Deckel, Gorton, Taylor & Hobson
GEAR EQUIPMENT: Barber Colman, Fellows, National Broach, Red Ring
GRINDERS, CUTTER, SURFACE, ETC.: Abrasive, Blanchard, Brown & Sharpe, Bryant, Cincinnati, Heald, Landis, Norton, Oliver Reed, Van Norman
LATHES: American, Hendey, Harding, LeBlond, Monarch, Pratt & Whitney, New 16" to 28" G. H. Gap
MILLS, PLAIN & UNIV.: B. & S., Milwaukee, Van Norman, New Univ. & Vert.
PRESSES: Bliss 5-48, Hamilton 800 Ton, Toledo
SHAPERS: Cincinnati 20", Rockford 24"
TURRET LATHES: Bardons & Oliver, Gisholt Nos. 2L, 5, Jones & Lamson No. 5, Preselector Bar Feed, Libby, 5" Capacity, Warner & Swasey, 1, 2, 4 Preselector

Pumps, Accumulators **HYDRAULIC EQUIPMENT** Injection Moulding Machines

Partial Listing—HUNDREDS OF OTHERS—Write for Catalog

AARON MACHINERY CO., Inc. Cable: AARMACH, N. Y.
45 CROSBY ST., NEW YORK 12, N. Y. Tel: WOrth 4-8233

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OPEN HEARTH (SAE 1020) STEEL PLATES

3/16" x 60" x 120"
¼" x 72" x 240"
5/16" x 72" x 240"
⅜" x 72" x 240"
½" x 72" x 240"
9/16" x 60" x 240"
1" x 72" x 240"
1⅛"-6"—Various Sizes

WIDE FLANGE BEAMS

6" x 6" x 20# x 40'
8" x 8" x 31# x 40'
8" x 8" x 40# x 40'
10" x 10" x 49# x 40'
10" x 10" x 60# x 40'
12" x 12" x 65# x 40'

DEFORMED REINFORCING BARS

200 ton—⅝" x 40'—Mild

MILD H.R. SHEETS

12 gauge x 36" x 72" HRPO
18 ga. x 35"/36" x 71"/72"
24 gauge x 36" x 72"

MILD STEEL ANGLES

1¼" x 1¼" x 3/16" x 20'
1½" x 1½" x ¼" x 20'
2" x 2" x 3/16" x 20'
2" x 2" x ¼" x 20'

Many other sizes and gauges available in I Beams, H Beams, Angles, Channels, Flats, Rounds, Plates, Sheets, Strip, Oil Country Goods, etc.

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LE BLOND 30" x 28' GUN BORING LATHE
Two Carriages; Quick Change,
Geared Head, Motor Drive
Value: Appraised $7500 — Quick Cash Price $3500.

POND SCREW CUTTING LATHE 52" x 20'
Motor Drive
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NEW HAVEN SCREW CUTTING LATHE 48" x 20'
Motor Drive
Value: Appraised $5900 — Quick Cash Price $2300.

THROPP ROLL FACING LATHES 44" x 16' and 44" x 20'
Value: Appraised $4500 each — Quick Cash Price $1700 each.

WE NEED

(will buy for Cash or trade above)

Two Vertical Millers #4 (or nearest)
Two Radial Drills 4' 13" Column
Eight Floor Drills 1½" Cap. 24"
One Mult. Drill 12 Spdls. 1" Cap.

WM. R. THROPP & SONS CORP.
(Engineers, Machinists and Founders) Trenton 5, New Jersey

6000 Lb. Chambersburg double frame Steam Forging Hammer.
2000 Lb. Erie Steam Drop Hammer, late type.
Multiple Punch No. 30-A W. W. 600-tons.
Multiple Punch No. 6 Cleveland 750-tons.
Multiple Punch Size G. L. & A. 940-tons.
300 Ton Oil Geared High Speed 2-Column Hydraulic Press, Stroke 18", ram 27" x 23".
750 Ton Williams White Self-Contained Down Moving Hydraulic Press, Bed 36" x 42", practically new.
Nipple Threading Machines (3), New 1950, ½", 1¼", 2". Roller Pipe Cutter.
H. & J. Straightening Rolls ⅝" x 48".
Kane & Roach #24 Angle Bender, Capacity 6 x 6 x 1".
5" Ajax Upsetting & Forg. Machs. twin gears, twin flywheels, susp. slides.
National Upsetting & Forg. Machs. 2", 4".
Ajax and Acme Upsetting & Forg. Machs., not susp. slides, sizes from 1" up.
Williams White Horizontal Bender & Straightener, Capacity 15" beams.
W.W. Bulldozers, #22, #3, #4, #29 Speed; #29-U type, reversing clutch.
Chambersburg Board Drop Hammers, 800 lb., 1200 lb., 2000 lb., 3000 lb.
Niagara Shear, Capacity 3 ft. 3/16".
Nazel Air Forg. Hammer #6-B, 7" sq.
Bradley Hammers, Cushioned Helve, Upright & Compact.
Bar Shear #12 B. C. Buffalo 5" Rd.
Bar Shears, Open End., Table cost on Slant; also Guillotine 1½" to 3".
Knuckle Joint Press 200-ton, 6" str.; EG-54 Ferracute 400-ton.
600-ton R. D. Wood Incl. Hydr. Locomotive Wheel Press, 96" betw. bars.
#50-A Quickwork Whiting Rotary Shear ¾".

BOLT, NUT & RIVET MACHINERY, COLD HEADERS, THREAD ROLLERS, THREADING MACHINES, TAPERS, COLD BOLT TRIMMERS, SLOTTERS, HOT HEADERS AND TRIMMERS, COLD AND HOT PUNCH NUT MACHINES, POINTERS.

DONAHUE STEEL PRODUCTS CO.
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NEW — USED — REBUILT

OVER 1000 MACHINE TOOLS 'IN STOCK'

Horiz. Millers, #3 Cincl., #4 and #5, High Power
Vert. Mill, #4 Cincl., High Power, Timken Bearing
Vert. Mill, #2 Brown & Sharpe, M.D.
Vert. Mill, No. 5C Becker Die Sinker, M.D.
Radial Drill, 3' x 9" Cincl.-Bickford, M. D.
Radial Drill, American 4' x 11", M.D.
Radial Drill, Cincinnati-Bickford, 5' x 13" column
Lathe, 32" x 16' Bridgeford heavy pattern grd. bd.
Lathe, 26" x 14' Lodge & Shipley, 9' c.c., mt. drive
Boring Mill, 120" Cincinnati Vert., 2 swivel heads
Boring Mill, 36" Bullard, Side Head, M.D.
Boring Mill, Bullard 24" Vertical Turret Lathe
Boring Mill, Lucas Horizontal, 3" Bar, M.D.
Hammer, Bradley 200# Rubber Helve
Punch, Hilles & Jones #5, single end 48" throat
Press, #78½ Bliss S.S., M.D.
Rolls, Bertsch 18" x 1⅝" cap., Late, M.D.
Shear, #8E Niagara, 8' x 3/16" Cap. M.D.
Welder—8pot, Federal 200 KVA, 60 cyc.

FALK MACHINERY COMPANY
16 WARD ST. BAKER 5887 ROCHESTER, N. Y.

FLANGERS, ¾" & ½" McCabe (2)
RADIAL DRILL, 5' 13" Col. Amer. Tri. Purp., M.
RADIAL DRILL, 5' 14" Col. Amer. Tri. Purs., Gear
RADIAL DRILL, 3½' Morris, 9½" col.
LATHE, GAP, 28/50" x 10' Rahn Larmon M.D.
LATHE, 48" x 20' Bed Amer., T.A., M.D.
LATHE, 14" x 6' Bed Amer., 18½" Sw., T.A., M.D.
SLOTTER, 20" Bement Miles, M.D.

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PHONE—PRESCOTT 9-8998

Brosius Charging Machine

2000# Brosius Auto. Floor Charging Machine. Combo. box & tong type. Charges boxes or baled material. 220/3/60. New 1945.

F. H. CRAWFORD & COMPANY, INC.
30 Church Street New York 7, N. Y.

Barber-Colman Model S Gear Hobbers.
Gleason 3" Straight Bevel Gen. 1942.
Thomas No. 6A O.B.I. Press, 1947.
Fellows No. 3M Hourglass Red Liner.

D E. DONY MACHINERY CO.
47 Laurelton Road Rochester 9, N. Y.

Eastern Rebuilt Machine Tools

THE SIGN OF QUALITY—THE MARK OF DEPENDABILITY

HONING MACHINES
H1 Micromatic Horizontal Hydrohoner, m.d.
H4 Micromatic Horizontal Hydrohoner, m.d.
No. 6 Barnes Twin Spindle Honing Machine, m.d.

MANUFACTURING LATHES
No. 3 Lodge & Shipley Duomatic, m.d.
Model B1—¾ H.P. Blount Speed Lathe, m.d.
W. C. Lipe Carbomatic Lathe, m.d.
Colborne Mfg. Bench Type Speed Lathe, m.d.
No. 4 LeBlond Boring Lathe,, 37' bed, 13" hole
No. 9, 12 LeBlond Multi-Cut, m.d.
3½x36", 3½x80", 4x60", 8x84" LoSwing, m.d.
8x132" LoSwing, m.d. latest
9x12" Sundstrand s.p.d.
11x18" LeBlond Rapid Production, m.d.
12x18" centers Monarch Model 5T, m.d.
17"x6' LeBlond Automobile Mfg., cone
17"x8' LeBlond Automobile Mfg., cone
Schauer Type NA28 Speed Lathe, m.d.

ENGINE LATHES
12"x6' Lodge & Shipley Geared Head, m.d., taper
13"x30" centers Pratt & Whitney Model B, m.d., taper
14"x6' bed Hendey Geared Head, m.d., taper
14"x6' Lodge & Shipley Geared Head, m.d.
14"x6' Pratt & Whitney, cone
14"x6' LeBlond, cone
14"x6' Sidney Geared Head, m.d.
14"x6' Springfield Geared Head, m.d., taper
14"x8' Prentice, m.d., taper
14"x8' Sidney Geared Head m.d.
15"x8' LeBlond, m.d., taper
16"x36" Pratt & Whitney Geared Head, m.d.
16"x54" centers American, m.d.
16"x6' Cisco Geared Head, m.d.
16"x6' Hendey Geared Head, m.d.
16"x6' Hendey Yoke Head, taper
16"x6' Lodge & Shipley Selec. Head, m.d.
16"x6' Lodge & Shipley, cone
16"x6' bed Monarch Geared Head, m.d.
16"x84" Pratt & Whitney Type B, m.d.
16"x8' Reed-Prentice Heavy Duty, cone, taper
16"x8' Monarch, cone, motorized
17"x6' LeBlond Geared Head, m.d.
18"x5' LeBlond Geared Head, m.d.
18"x6' bed Lodge & Shipley, cone, motorized
18"x6'6"Greaves-Klusman Geared Head, m.d. in leg
18"x7' Hendey Geared Head, m.d., taper
18"x8' Hendey Geared Head, m.d.
18"x8' Lodge & Shipley Selec. Head, m.d.
18"x 8' Champion, cone
18"x8' Whitcomb-Blaisdell, Geared Head
18"x8'6" bed Walcott, cone, motorized
18"x10' Boye & Emmes, m.d.
18"x10' Springfield Geared Head, m.d., taper
19"x6' centers LeBlond Geared Head, m.d., taper, late
20"x10'6" bed Schumacher & Boye, cone motorized
20"x8' bed American Geared Head m.d., taper
20"x8' Cisco, cone
20"x8' bed Greaves-Klusman Geared Head, m.d. in leg
20"x8' bed Boye & Emmes
20"x10' Boye & Emmes, cone
20"x10' Lodge & Shipley Geared Head, m.d.
20"x10' Sidney Geared Head, m.d.
21"x8' Heavy Duty LeBlond Geared Head, m.d.
21"x10' LeBlond Geared Head, m.d.
23"x12' LeBlond Geared Head, m.d., taper
23"x12' LeBlond cone, motorized
23"x14' bed LeBlond Geared Head, m.d., taper
24"x10' Greaves-Klusman Geared Head, m.d.
24"x12' bed Boye & Emmes, belt drive
24"x12' Bridgeford Geared Head, m.d., taper
24"x16' bed American, cone, motorized
24"x16' bed Cisco, cone, motorized
24"x24' bed Lodge & Shipley Geared Head, m.d., taper
24"x30' bed American Geared Head, m.d., taper, late
25"x10' bed LeBlond Geared Head, m.d., taper
25"x12' bed Geared Head LeBlond, m.d., taper
25"—50"x6' centers LeBlond Gap Lathe, m.d.
30"x12'6" Niles-Bement-Pond, m.d., taper
30"x13'6" bed Niles-Bement-Pond, m.d.
30"x16' bed Lodge & Shipley Geared Head, m.d., taper
36"x12' bed Lodge & Shipley, m.d.
36"x38' American Triple Geared Internal Face Plate Drive, m.d., taper
48" American (raised to swing 54") x 17' bed, m.d.
42" Putnam (raised to swing 56½") x 20' bed Geared Head, m.d., 11'8" centers
30" raised to swing 44" x 15' bed American, m.d.

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44	110	Ingersoll	368	100	I.R.-C.P.T.
64	80	Ingersoll	379	40	I.R.-Worth.
68	110	Penn.-Am.	386	115	I.R.
88	125	Worthington	480	125	Worth.
88	60	I.R.-Penn.	503	60	I.R.-Jay
93	100	C.P.T.-I.R.	568	100	I.R.-C.P.T.
122	100	I.R.-Worth.	594	20	I.R.-Worth.
153	40	Penn.-I.R.	740	40	Penn.-I.R.
161	60	I.R.-Am.	868	125	C.P.T.
166	135	I.R.-Am.	931	55	I.R.-Worth.
178	100	Am.-C.P.T.	1060	125	C.P.T.
187	40	C.P.T.-I.R.	1084	30	C.P.T.-I.R.
211	100	Worth.	1180	125	C.P.T.
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240	110	Penn.	1987	12	Worth.

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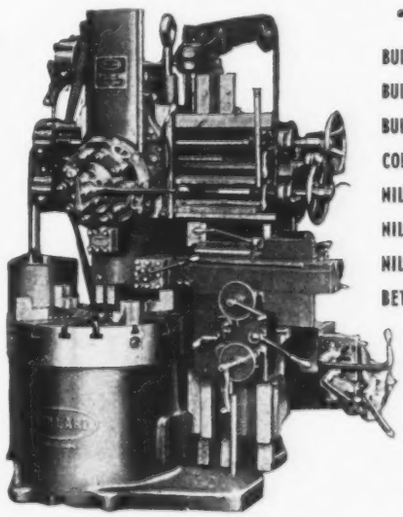

BULLARD 42" Vertical Boring Mill
Spiral drive

BULLARD 42" Vertical Boring Mill—Spiral Drive
BULLARD 54" Vertical Boring Mill "New Era" Type
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COLBURN 72" Vertical boring mill; P.R.T.
NILES BEMENT POND 53" heavy pattern
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No. E5 NATCO Multiple Spindle Drill—Hyd. table, '42

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No. 12 FELLOWS Gear Shaver, 1943
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6" x 18" NORTON Vertical Spindle Surface Grinder
10" x 24" LANDIS Universal Grinder
10" x 72" LANDIS Type C Hyd. Pl. Grinder—'42
No. 104 RIVETT Internal-External Grinders
No. 73 HEALD Internal Centerless Grinders
No. 172 HEALD Internal Grinder

LATHES
14" x 54" REED PRENTICE Geared Head Engine Lathe
16" x 30" LODGE & SHIPLEY Toolroom Lathe, '41
27" x 14' sc LEBLOND HD Engine Lathe, 42
30" x 16'' bed AMERICAN "High Duty" GH
36" x 19' bed AMERICAN HD Lathe
42" x 25' sc AMERICAN "Super Productive" GH Lathe—two carriages

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Nos. 0-8 CINCINNATI Plain and Vertical Milling Machines
Nos. 1-8 & 1-14 KENT-OWENS M.D. Prod. Millers
Model MM-5 U.S. Multi-Miller
No. 2B&S Pl. Light Type Miller
No. 2M CINCINNATI Vertical Millers, 1941
18" CINCINNATI Mfg. Knee Type Milling Machines
4½ x 36" P&W Model C Thread Miller
36" x 36" x 16' INGERSOLL Planer Type Milling Machine—3 heads
36" x 36" x 12' INGERSOLL Planer Type Milling Machine—3 heads Late

AUTO. LATHES & TURRETS
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No. 2 W&S Geared Friction Hd. Turret Lathe
No. 3 J &L Ram Type Universal Turret Lathe
No. 1H5 LIBEY Heavy Duty Turret Lathe
No. 1L GISHOLT Saddle Type Turret Lathe, 1942
Nos. 4D & 6S POTTER & JOHNSTON Auto. Lathes

MISCELLANEOUS
15" BETTS Vertical Slotter
½B P&W 2-spindle Reaming Machine
4" TAYLOR & FENN Spline Miller
6" P&W Upright Shaving Machine
24"x24" 6' GRAY Double Housing Planer, 1941
36" MORTON Draw Cut Shapers, 1945

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Cincinnati 10'—2 swivel heads—Massive type—MD

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Billings & Spencer 800 lb. and 2000 lb. Model D Board Drop Hammers
United Engineering 3000 lb. Board Drop Hammer
National 3" Upsetter—Stroke of headers 12"—Die space 17½" x 20"—Work conveyor

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V & O #1, 2½, 3½, 4 and 5 Open back inclinable—All MD, some with Reeves drives and roll feeds
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Lempco Hypermatic—Stroke 3"—Strokes per minute 1000—Die space 18" x 18¼"—Thermostatic control—MD—Very late type
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RADIAL DRILL TABLES, 36" x 20" x 20" (10)
RADIAL DRILL, 6' 15" col. Amer., M-on-Arm
RADIAL DRILL, 5' 15" col. Amer., M-on-Arm, Trl.
RADIAL DRILL, 5' 14" Col. Amer., M.D.
RADIAL DRILL, 5' Niles, No. 10, M-on-Arm, Late
RADIAL DRILL, 4' 11" Col. Cinci. Blck., M.D.
RADIAL DRILL, 4' Western, M.D. (2)
RADIAL DRILLS, 3' 8" & 2½' (New)
DRILL, 24" Cinci. Blck., Tapping
DRILL, No. D8 Colburn 30", 3" capty.
DRILL, No. 314 Baker, 24", 3" capty.
GEAR CUTTER, No. 13, B. & S. Spur & Bevel
GEAR SHAPERS, Nos. 8 & 75 Fellows
GEAR SHAPER, Nos. 61A, 64A & 84 Fellows, 1945
GRINDER, CYL., 4"x18" Landis #4H
GRINDERS, CYL., 10" x 48" Cinci., M.D.
GRINDER, SURFACE, 30" Blanchard, No. 18, M.D.
GRINDER, SURFACE, 14" P. & W. Vert. Spin. B.B.
GRINDER, UNIV., 12" x 36" Thompson, M.D.
GRINDER, Micro Int. M.D.
GRINDER, No. 6-T Sellers Tool, '42
KEYSEATER, No. 3½ Baker, 26" x 4" capty.
LATHE, 60" x 45' cen. Mackintosh-Hemphill, 1942
LATHE, 48" x 20' Bed Amer., T.A.
LATHE, 48" x 20' Cen. N.B.P., M.D.
LATHE, 32" x 14' S. & S., M.D., T.A.
LATHE, GAP, 26"/50" x 16' Rahn Larmon, T.A.
LATHE, 26"/48" x 24' Bed, McCabe, Dbl. Spin.
LATHES, 26"x12' Bridgeford QCG Grd. Hd., M.D.
LATHE, 25" x 12' Bed. B & E. T.A., Grd. Hd.
LATHE, 20" x 78" Matra, T.A., New
LATHE, 20" x 10' Bed Amer., Grd. Hd.
LATHE, 18" x 8' Bed, L. & S. Select Grd. Hd., M.D.
LATHE, TURRET, No. 3A W. & S., No. 699397
TURRET LATHE, 21" Acme Univ., Brass, Late
TURRET LATHE, No. 1B Foster, Univ. 2" capty. (2)
TURRET LATHE, No. 2B Foster, Univ. 3¼" capty.
TURRET LATHE, No. 3 AL Gisholt, 6¼" H. S.
TURRET LATHE, No. 3 Gisholt, Bar & Chuck
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MILLER, No. 2 Van Norman, Duplex, M.D.
MILLERS, No. 3 Cinci. Pl. Motorized
MILLER, No. 4 Cinci., High Power Universal
MILLER, No. 22L Van Norman Ram Type
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SHAPERS, 28", 20" & 16" Gould & Eberhardt
SHAPER, 24" Gemco "Kelly" Univ. Tble., '42
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Qu	HP	Make	Type	RPM
1	285/300 (Spare armature & anti-friction bearings for above motor)	G. E.	MDP-420	350/410
1	150/200	Whse.	MCB-100	370/300
1	150	Whse.	MT-5	350
1	100/140	Whse.	MCB-90	500/415
4*	100/140	G. E.	MDA-108	430/500
8	100/130	G. E.	CO-1831	575/600
2	85/85	Whse.	K-10	635/700
1	75/60	Whse.	K-10	425/470
1*	75/100	Whse.	CK-10	500/575
5	70/90	Whse.	MCA-70	440/400
2	70/90	Whse.	MCB-70	440/400
1	50/80	C. W.	FW	575/480
1	50	G. E.	CO-1829	750
1	50/65	Whse.	MCLA-121	500/450
2	50/65	Whse.	MCA-60	475/425
1	50	G. E.	CO-1810	725
1	45/85	G. E.	CO-1830	700/650
1	45/85	G. E.	CO-1811	600/500
4	45/57	Whse.	K-9	515/470
1	45/57	Whse.	KG-9	515/470
2	35/45	G. E.	CO-1810	500/450
1*	35	G. E.	MDA-104½	650
1	30	C. W.	EH	750
1	25/35	G. E.	CO-1829	750/450
1	27½	Whse.	K-8	1050
2	25/33	G. E.	MDS-408	575/500
2	23/30	G. E.	MDP-408	600/415
8*	20/28	Whse.	MCA-40	600/470
6	19/15	Whse.	K-5	630/560
3	16/19	C. W.	BW	620/560
1	16/13	G. E.	MDS-406	615/700
1	15	G. E.	CO-2305	700
1	15/19	G. E.	CO-1807	600/525
1*	13/17	G. E.	MDA -103	645/725
1*	13/17	G. E.	MDB-103	645/725

All motors series wound except those marked (*) which are compound; can furnish these for series operation.

SYNCHRONOUS MOTORS
3-Phase—60-Cycle

Qu	HP	Make	P.F.	Volts	RPM
1	6000	G. E.	100	2300	90
1	4350	C-W	100	13,200/6000	514
1	3000	Whse.	80	4800/2400	720
2	2100	G. E.	100	2300	360
3	1750	G. E.	100	2300	3600
1	1000	El. Mchy.	100	440	1200
1	750	G. E.	80	2300	450
1	700	G. E.	80	2300	720
1	250	G. E.	100	2300	514

With these we can supply—manual, semi or full magnetic, full or reduced voltage control.

Motor Generators of modern design, complete with control—still on their original foundations—available for immediate shipment.
(3)—G.E. 1500-KW, 250-VDC, 514 R.P.M., spd., interpole, pole face windings, 2100-HP syn. motors, .8-PF, 13,200-V, 3-ø, 60-cy. will reconnect to 6600 V. or 4160-V.

SLIP RING MOTORS—CONSTANT DUTY
3-Phase—60-Cycle

Qu	HP	Make	Type	Volts	RPM
1**	1800	G.E.	MT-498	2300	857
1**	1200	G.E.	MT-26	2200	277
2**	1000	Al. Ch.	ANY	2200	225
1	800	G.E.	MT	2200	440
1**	600	G.E.	MT-20	2200	300
2	500	G.E.	1-16-M	2300	450
1**	400	Al. Ch.	ANY	2200	514
2	400	G.E.	MT-412	2200	450
1	250	Whse.	CW-937	440	1200

From our stock we can furnish manual and magnetic primary and secondary controls up to 3500-HP.

MOTOR GENERATOR SETS

Qu	KW	Make	RPM	Volts DC	Volts AC
1(3-U)	2400	Whse.	720	600	2400/4800
3	1000	Whse.	514	600	11000/6600
4	1000	G.E.	514	600	11000/6600
1	1000	G.E.	514	600	2300
1	500	C.W.	720	275	2300/440
1(3-U)	500	Whse.	1200	250	440
2	500	C.W.	720	575	2300/440
2	250	Whse.	1200	125/250	2300
1	200	Ridgway	900	275	2300
1	155	G.E.	720	250	2300/440
2	150	Whse.	1200	250	2300

We can furnish any of these sets with exciters and VARIABLE VOLTAGE CONTROL engineered and rebuilt to your requirements.

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10-ton Champion 100' span between ground rails, 31' overhang one end, 23'9" other end, 45' lift, with 1200' of 100# rail. Now 550-VAC, will arrange for 220/440-VAC or 230-V.D.C. AVAILABLE FOR IMMEDIATE INSPECTION AND SHIPMENT. In excellent condition. The kind of crane that is seldom on the market.

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16" Gould & Eberhardt Shaper
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Lodge & Shipley Lathe—Serial #29051
#2 Norton Tool & Cutter Grinder—Serial #3355
8D Potter & Johnston Automatic Chucker—Serial #70393
72" King Heavy Duty Vertical Boring Mill Serial No. Lot 38—#175
Rowbottom Cam Miller—Serial 135/49. Rebuilt & guaranteed
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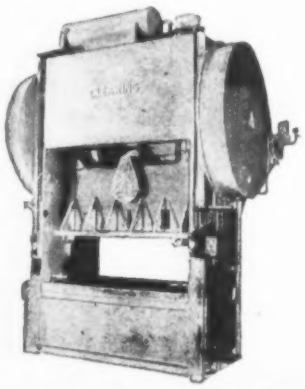

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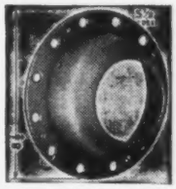

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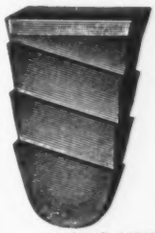

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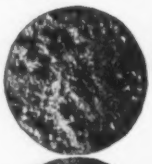

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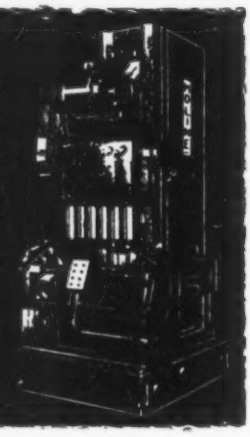

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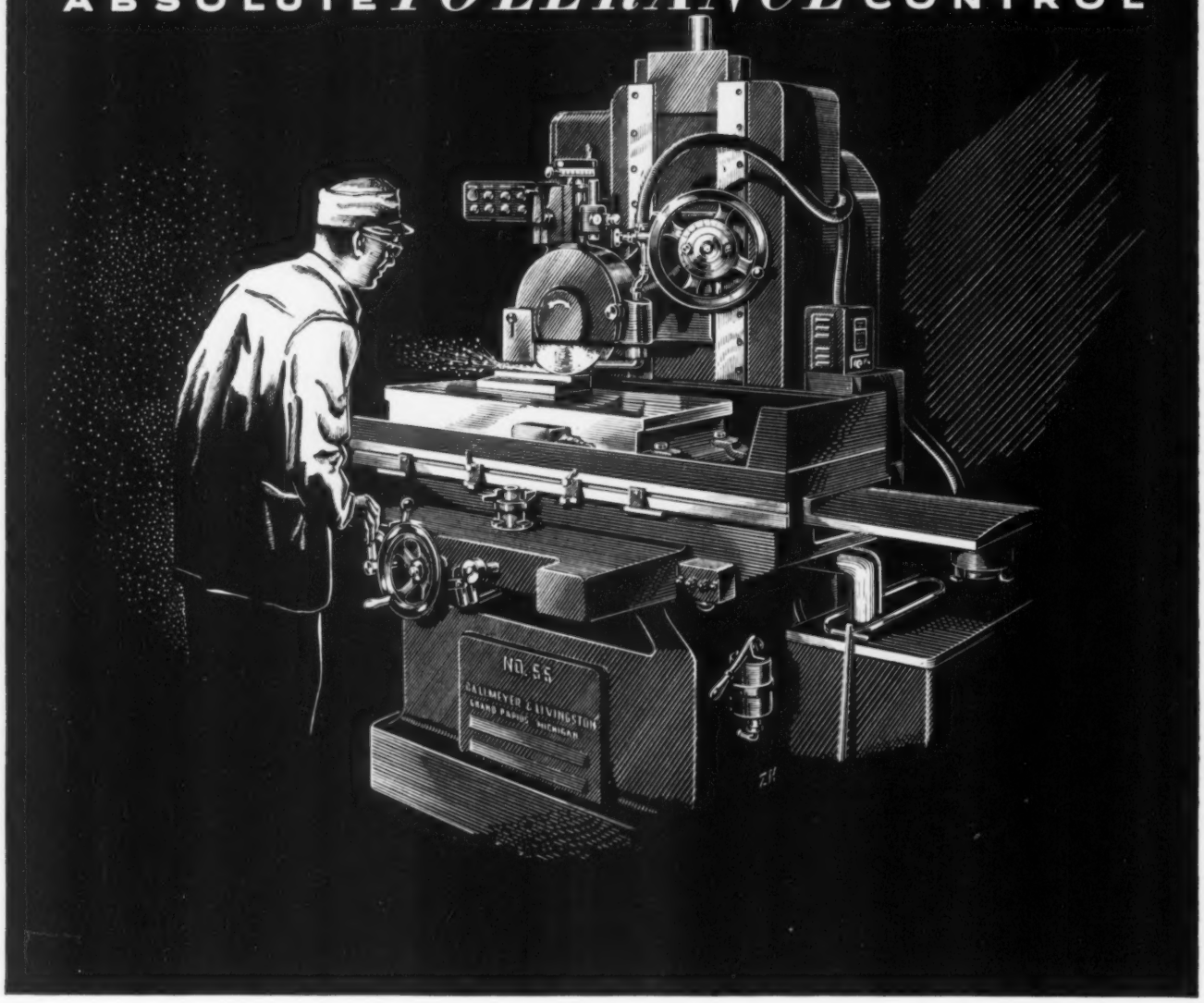

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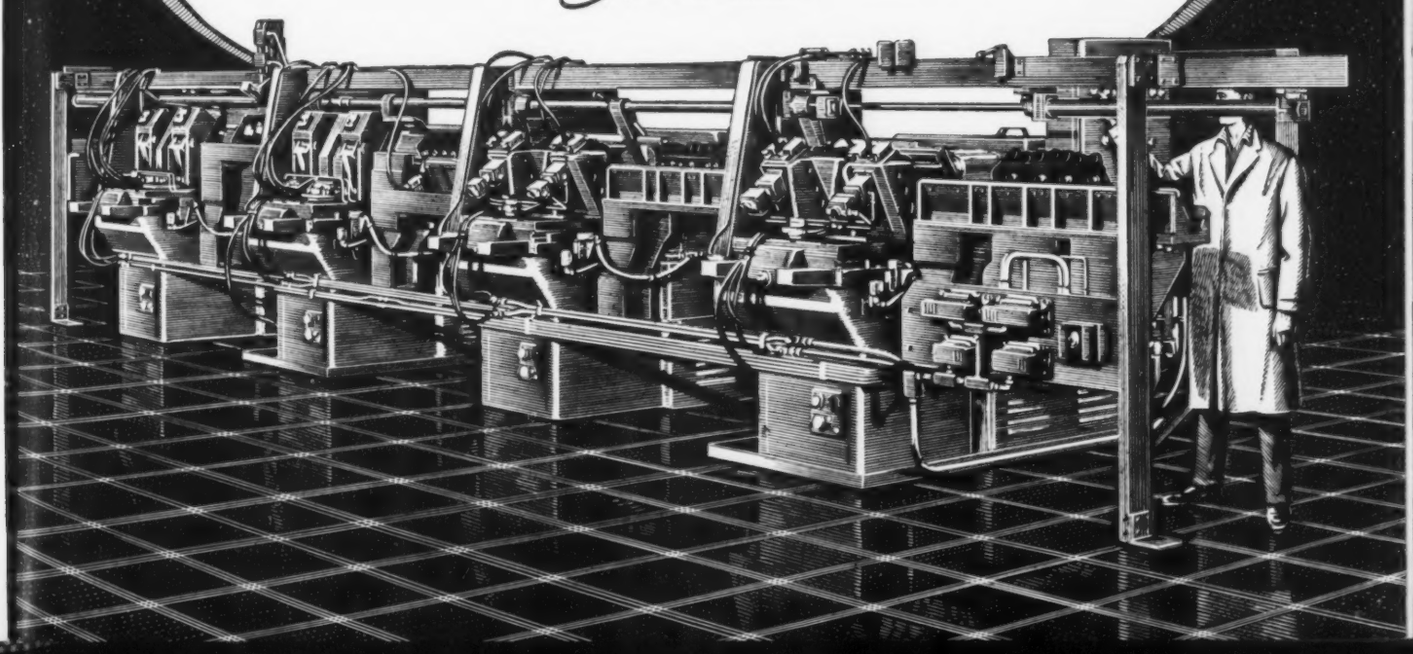

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